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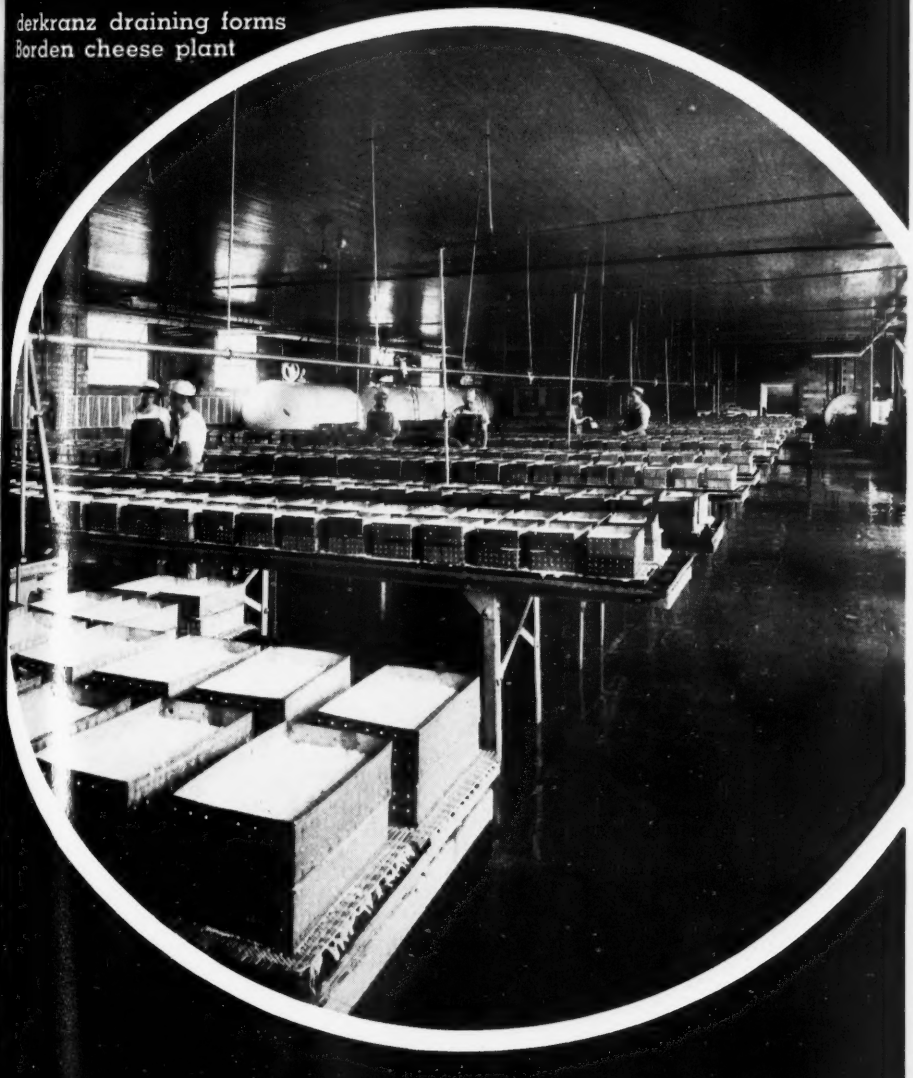

derkranz draining forms
Borden cheese plant

FEBRUARY 1945

Ideas for the Bakery Of Tomorrow

Bottling History Made in Hawaii

Advances in Fruit Processing

How to Add Vitamins To Candies

Art and Technology Team Up on Cheese

New Methods Make Dried Fruit Better

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THE COVER

In the manufacture of Liederkranz cheese, the curd is dipped into metal draining forms when ready. These bottomless rectangular forms are placed on reed mats which speed up, and make more uniform, the whey drainage from the curds. These draining forms are shown on the cover. Details of the Liederkranz process are given in the article on page 86.

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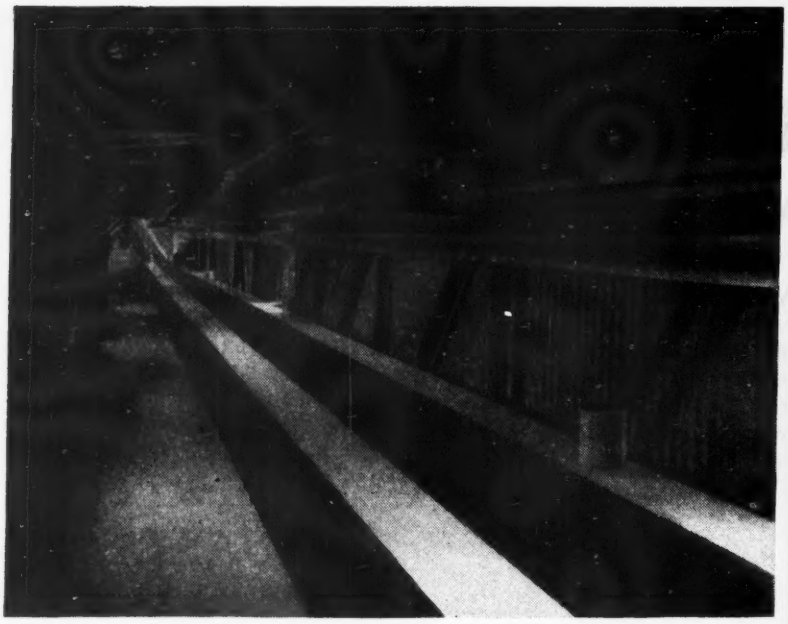

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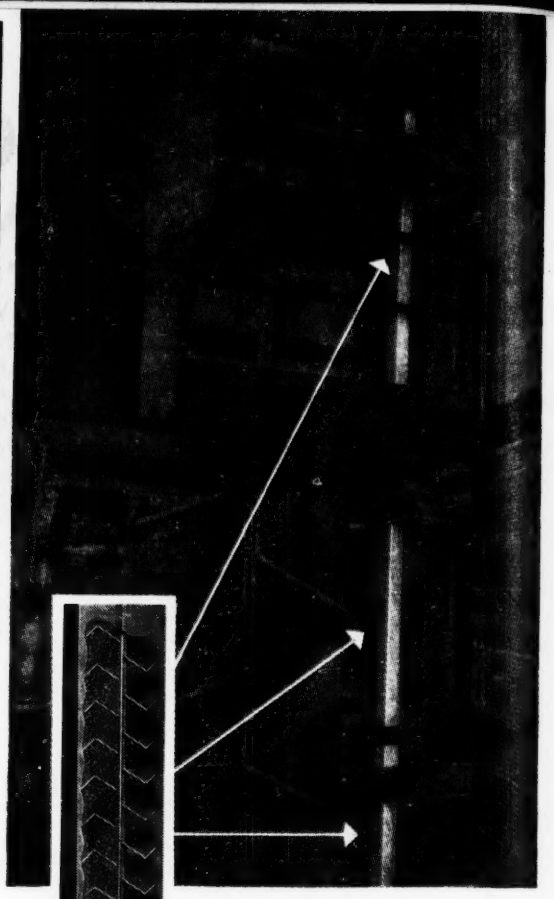

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Progress Toward More Jobs

ONE of the very hopeful signs for the future of living in the United States is the widespread study of every possible way to bring about full employment for all who want to work after the wartime demand is over. For the first time, everybody in the country is becoming aware of the true field of political economy, and is taking a personal interest in the welfare of the whole country.

Only the most naive and generous minds will say that the interest is wholly unselfish. But the mere fact that everybody seems to be thinking about the national problems augurs well for the future. For until there is great mental effort on the part of all, leading to understanding of the relation of the prosperity of the nation to the welfare of the individual, today's magnificent effort to avoid future economic depressions cannot meet notable success.

Here are the phases of the development of the national program as they have appeared up to now. First was the view held by professional economists, mainly located in Washington, that it took a war to produce jobs for everybody. In other words, it was government buying that brought it about.

Next came phase two: The realization by a few farsighted business men that when the war is over, business will be on trial to see if private enterprise and initiative also can provide all the jobs that people will want after the government withdraws from the market. The choice lies between business enterprise or government action.

It was over a year ago when the Committee for Economic Development was created by private business. CED was to stimulate every possible effort to make jobs. The idea has taken hold. Increasing attention is being paid to it in every convention of business men. Industry is pretty well aware of its role and what it must do. Here and there are now to be heard new voices who point out that new products and plans for their manufacture are not enough. The new products also must be *sold*, both to people and to industry, both in the U. S. and abroad. The selling job will be of terrific proportions. This realization, which is just beginning to permeate the minds of the better informed people, is the beginning of the third phase.

The third phase, as I see it, will be a period of further discussion and exploration. It will be an attempt to discover how to sell the stupendous quantities of peacetime goods that will be the very basis of full employment. Today we are at its beginning.

A year, at least, of talking about the selling jobs ahead for the whole nation will focus attention on two important aspects of our economic future. One of these aspects will be the widespread discovery that certain domestic markets are not noticeably elastic. They depend on total numbers of people, not on their elastic desires. Total food consumption—not merely manufactured foods—is one. No matter how we may strive, it is not possible to double the per capita consumption of food, though we may increase it slightly. Yet many business leaders calculate that the number of peacetime transactions of business must be doubled to produce full employment. Coal and fuel-oil consumption for domestic heating is another relatively inelastic market. We cannot look forward to higher temperatures in our homes as a way to produce more jobs, though many homes of the very poor need more heat.

This line of inquiry will lead to the further realization that lumber will not be cut, minerals will not be mined, and many other activities will not be undertaken unless there are actual buyers all the way to the consumer who really want the products and have the money to pay for them. And, in turn, this will lead to the further discovery that the possibility of greatly increased expansion of sales of manufactured goods will be limited to a relatively few lines unless new ones are invented. These are the consumer durable goods like automobiles, radios, refrigerators and mechanical household gadgets. We ultimately will discover how future prosperity depends on the inventors of new things that everybody will want. By that time, we may possibly look for government encouragement of research leading to patents, instead of the disapproval that exists in so many quarters today.

The fourth phase of our thinking on the economic future of the nation will begin when people, thinking as consumers rather than as producers, begin to realize that the prosperity of the nation depends on their willingness to buy generously, even at times when the psychological tempo favors saving. This will include buying of imported items as well as those of domestic manufacture. That phase will be the merchandising and educational period, and its success will be predicated upon the care and skill with which detail credit policies are controlled, no less than upon the self-restraint with which people handle their own affairs when easy credit is offered.

In the months to come, I shall discuss a number of ideas connected with the third and fourth phases of our economic development. Most of it will be directed to the principle that if the consumer can obtain his food at low cost, he will have more money available to spend on other items, which will do more to create employment than if the money were spent for higher cost foods.

L. V. Burton EDITOR

The Talk of the Industry

• WHAT some folks glibly call the problems of "distribution" (when they exist) are merely the problems of living with a manufacturing capacity too great for the market, and manufacturing costs too high for enough people to afford.

• JUST 4 days after OPA announced further rationing of foods, January 4 to be exact, Secretary of Agriculture Wickard told the annual meeting of the Agricultural Extension Service something that would tend to offset any good that might have come from tighter rationing. He warned that agriculture's tremendous producing power might prove disastrous.

• YET another example of failure to get together came shortly before Christmas, when Lt. Col. Ralph Olmstead, deputy director, Office of Distribution, WFA, made a speech saying that the government could provide outlets for 365,000,000 lb. of dried eggs. But N.E. Dodd of AAA has been trying to get the farmers to produce 16 percent fewer eggs. This row landed in Marvin Jones' lap after the damage was done. It seems that the question is whether Lend-Lease will finance the big operation.

The boys ought to get together on their stories.

• THE war is seen to be changing our eating habits; the return of troops who are now learning to eat a well-balanced diet will have a tremendous influence on our eating habits in a decade or so when these 11,000,000 men become heads of families; as a nation, we are in the midst of developing new tastes; we are in a stage of trasition from old tastes to improved tastes. Thus optimistically reports the daily press after listening to Lt. Commdr. C. M. McCay addressing the American Public Health Association.

It is to be hoped that the gentleman is correct. But we believe with Flora Stearns that the dietary habits of the human race are formed in the first twelve years of life, not in that period known as military age. Anyone with an observant eye who visits the front can easily discern an unregenerate craving by all GI's for that which they hadn't orta eat.

• RESEARCH at Ralston-Purina Co. has made it possible for any one to raise incubator turkeys successfully. Big trouble, it seems, was to get the poults (little turkeys) to eat. They just don't have enough sense. But the boys at Ralston-Purina discovered that turkeys will imitate a baby chicken, which starts to eat as soon as it emerges from the shell. So the answer to all the old perplexities is to hatch out a few chicks at the same time as the turkeys.

Yet one can't be too sure about the intellectual capacity of the chicken. We recall that Michael P. Vucassovich, food technologist of Gorton-Pew Fisheries Co., once took home some laboratory-bred hens and had to sit up nights with them to teach them how to get up onto the roosts.

All of which goes to prove that Food Technology is a wonderful profession.

• Now the story can be told about the submarine crew who were presented with a live chicken by the grateful inhabitants of a tropical island where they had been ashore on reconnaissance. On the first day at sea, the hen laid an egg which was duly fried for the skipper's breakfast. Next day, the hen laid another egg, but it was minus a shell. One of the smart GI's rummaged around the ship's garbage, which had not been dumped, found the discarded shell from the first egg, pulverized it and gave it to the hen with its feed. The third egg had a perfectly formed shell. According to last reports the same shell is still circulating effectively and everybody is satisfied.

Hors d'Oeuvres

• A record crop of more than 200 million pounds of popcorn was harvested last year, 23 percent more than the record 1942 crop. Now if we had some butter to pour over it.

• *There isn't a squirt in a carload. So said five western governors when they met in Phoenix, Ariz., recently to start a $200,000 campaign to promote desert-grown grapefruit. That's really plugging the product.*

• Farmers are to get enough ammunition to control predatory animals and birds. And there ought to be enough rock salt to keep the kids out of the melon patches.

• *Those in the know have dropped the idea that Germany is running short of food and can be starved out. And we all laughed when Adolf sat down to his dish of ersatz.*

• Sugar Research Foundation is compiling a list of unusual uses for sugar. Wonder if they have this one—sugar in coffee?

• *The General said "Nuts!" And he didn't mean paper-shell pecans.*

• Farmers produced a record 25 billion pounds of meat last year. Sounds like a lot of bull, but we have it on good authority.

• *With General Hershey going after the nation's young farmers, you better plant an extra row of beans in your backyard this summer.*

• Surveys show that the use of lemons as a treatment for colds has increased 252 percent in the past six years. People are Sunkissing their colds goodbye.

• *Flame throwers have been ruled out by the Department of Agriculture as possible postwar farm equipment for weed eradication. They are too dangerous and too expensive to operate. But they would be handy for giving a balky horse the hot hip.*

• An armored division uses 39 tons of food every day, so it doesn't take it long to eat its weight in General Shermans.

• *In Normandy they blend the juices of as many as eight varieties of apples to make a super cider. They also make a choice apple brandy by skillful processing and patient aging in wood. The French seem to sophisticate everything, even their Jersey Ligthning.*

• Candy bars account for about 40 percent of the food eaten outside the mess hall by men in the armed services. And just try taking candy from those kids!

F.K.L.

A laboratory in this plant of tomorrow? There are a great many things that a laboratory can do for the progressive baking plant.

Ideas for Bakery of Tomorrow

It just happens that the man who wrote this is a bakery technologist, so he talks in baker's language. But you won't need an interpreter to get the point of his remarks, whatever your business. These thoughts for postwar are plain in any language.

By W. R. VAN METER, Chemist, Kingston Cake Co., Kingston, Pa.

THE jingle that we sang as children playing in the hour between dinner and bedtime, "Rufus, Rastus, Johnson, Brown, what you goin' to do when the rent comes 'round?" might well be the theme song for many an executive conference in the baking industry today. For tomorrow—meaning, in most minds, when the war is over and current production and selling restrictions are lifted—will bring the day "when the rent comes 'round" with greater force to the baker, perhaps, than to most other food manufacturers.

At present—because of rationing, a high level of industrial employment, the absence of women from the kitchen and the difficulty of getting domestic help—the baking industry's production has gone to an unprecedentedly high mark. The commercial baker of today has won a greater beachhead than he has ever before enjoyed in the home-baking field. Will the baker of tomorrow expand on these gains?

What are some of the things that the baker can do to hold onto this newly acquired market? In the opinion of this writer, they can be divided roughly into those changes which will affect the quality of the product—preferably to raise it—and those changes which are likely to influence the cost—preferably to lower it. The purpose of this discussion is to set a practical goal which bakers can strive to reach and which is possible of attainment.

Your Equipment I. Q.

On the side of equipment for the bakery of tomorrow, it is the writer's opinion that the type of organization and the mental attitude of the top management largely determine the equipment setup of the plant. As a matter of fact, a great deal can be deduced concerning the philosophies, political beliefs and I. Q. of top management in any plant from a study of the types of equipment used there. Of this angle of the bakery of tomorrow, and its potential effect on raising quality and lowering production costs, more will be said in just a moment, for it goes much deeper than the use of this or that machine for a specific purpose in the bakery.

One trend that has been taking place, and probably will continue, is the drive to eliminate as much as possible of the handwork that goes on in many bakeries.

It should, for example, be possible to eliminate much of the hand trucking of materials. Liquids could, in many cases, be pumped from storage tanks directly to point of

use, and, instead of being weighed, could be measured by some form of metering device, as is now widely done in the confectionery industry.

Management, Men, Money

Underlying this thought, there is the idea that tomorrow's baking plant should be a more self-sufficient business organization than it is today. The plant should have in its own organization men whose job it is to know more about all phases of the company's business than an outside service concern. This should apply, it seems to the writer, in such fields as engineering and layout, laboratory, cost study work, production, sales and purchasing.

In the long run, it is well worthwhile to pay for the type of personnel that is needed, rather than to go along with run-of-the mine help and periodically employ outside specialists. The trouble with the outside specialist too often is that he has only the average orthodox point of view and that is not going to be good enough in tomorrow's business world.

The study of costs will get considerably more attention in this bakery of tomorrow than it frequently does at present. Not something done once or twice a year, but a fund of information kept constantly up to date, to the end that the cost of getting every variety into the hands of the consumer is known to management at all times. Related to this should also be a gathering of information that perhaps might be dignified under the term "market research"—collecting knowledge of production costs, and so forth, of other firms in the industry, and serving as a possible source of new ideas for new products or improvements of old products.

Lab Not a Gadget

A laboratory in this plant of tomorrow? There are a great many things that a laboratory can do for the progressive baking plant. But almost equally important with the type of man put in charge of this department is the type of man at the head of the company. Unless the man at the top is going to have a keen and continuing interest in the lab, and a fair idea of what he expects to get from it, it would be better not to start. A laboratory is not something in the gadget class, to be attached to an organization and then forgotten the while it produces in some mysterious fashion rather remarkable results.

Running the production department is not a routine sort of a job — it requires imagination, knowledge and a flair for visualizing simpler and less orthodox means of accomplishing the desired results.

Above All

But above all, the production department should have broader responsibilities than just the overseeing of the day's production alone. The best part of its activity should be devoted to keeping the costs of production below the average of the industry, while at the same time maintaining the quality of the product equal or superior to the best.

This is not a routine sort of job —it requires imagination, knowledge and a flair for visualizing simpler and less orthodox means of accomplishing the desired results. It will take a topflight production man, and probably one who is not a trained baker. In too many cases, the trained baker has had drilled into him for years and years the traditional methods of doing an operation, until he has gotten to the point where a radical departure from accepted practice is no longer possible.

Hold Those War Gains?

Strangely enough, there seems to be a fairly widespread opinion among bakers that the gains of the last few years will be easily — in fact, almost automatically — held. This group points out that after the last war commercially baked bread virtually captured the bread market and the homebaking of bread dwindled to negligible proportions. This same condition, it is assumed, will prevail after this war, insofar as cakes and pies are concerned, since the housewife, because of rationing and war work, has done comparatively little baking of these products in the last few years. Bakers' cake and pie will have gained acceptance in the kitchens of the country, just as bakers' bread has done — or so the reasoning runs.

From where this observer sits, such thinking is largely wishful. The gains made will be held with difficulty, instead of easily. And to hold them will require considerable thought and time.

Briefly, the reasons why it does not appear that cake and pie baking has been automatically and permanently taken out of the housewife's hands are that these foods are relatively easy to make at home. And in most cases a cheaper and better product can be made than can be bought. There is also a certain creative satisfaction about the whole process that women like.

In this connection, consider our own experience with tomatoes during the last two summers. Planting never more than two dozen plants on a plot 15x20 ft., we were supplied with all the eating tomatoes that a family of five could consume, plus enough for canning to take care of our winter juice requirements. The cost per quart jar of tomatoes on our pantry shelf is only a fraction of the market price, while—in the opinion of our family —the quality is equal to that of any of the brands we used to buy. So why should we ever want to buy canned tomatoes, or tomato juice, so long as there is ground in the back garden and Mr. Burpee sells seeds?

But the point to be made, in this writer's opinion, is that Mr. Campbell, Mr. Ritter and fraternity have lost a tomato customer simply because it is possible, without much effort in our home, to equal their quality at a fraction of their cost. They may win the customer back—modern advertising is a powerful force—but my wife says it will be a tough fight.

Similarly, the baking industry has gained customers because of unusual and temporary conditions. But to hold them when the housewife once again finds it possible to produce goods equal, or superior, to the bakers, and at less than the bakers' price — well, the baking industry will have a tough fight on its hands.

Go Back to the Good

The question of ingredient quality must be considered by the baker of tomorrow. Every baker the writer has ever talked to maintains

that he buys only "quality" raw materials, yet baker "A" buys cocoa, for instance, at 10 cents a pound, while baker "B" spends 15 cents a pound for his cocoa. Which one bought "quality," assuming that each one got exactly what he paid for? And how is the baker going to bake a better cake than the housewife can if he uses ingredients that are inferior to the ones that she herself will use?

Wartime shortages have driven many bakers to the use of ingredients which have enabled production to be maintained in the face of shortages, but have nevertheless hurt the quality of the product to some extent. Granted that their use has been necessary in the emergency, and that the consumer has accepted them in a philosophical frame of mind, it is still No. 1 on

Mrs. Appleyard says: "When I feel economical, I do not make cake. I prefer a raw carrot stick to any cake which has been constructed from motives of economy."

the improvement list for most bakers to abandon the excessively high percentages of the various substances used as replacements for sucrose in baked goods. Lest there be any misunderstanding on this point, let me say that there is undoubtedly a place for ingredients such as refiners' sirup, malt sirup, corn sirup solids, corn sugar and the like—and the baking industry is very fortunate to have had them to turn to in the emergency—but in the interest of a better product, their use should be limited when sucrose again becomes available.

Cost, of course, has to be a consideration, but the solution is not the use of lower quality ingredients.

At this point I would like to quote from that most excellent book on cooking, "Mrs. Appleyard's Kitchen," in which Mrs. Appleyard says: *"Neither am I going to give any recipes for economical cakes. When I feel economical, I do not make cake. I prefer a raw carrot stick to any cake which has been constructed from motives of economy."*

Saying a Mouthful

One potent ally that the baker has in his fight to hold onto his new market lies in his own mouth. Let him pay increased attention to the flavor and taste of his product, so that at least he knows what sort of cakes and pies he is making. Outside of men cast away at sea, or lost in desolate areas, few people eat for survival. Most of us eat because we like the taste of food, and this applies with special force—because of their relatively high cost—to bakery products such as cake and pie.

Therefore, a definite schedule for tasting samples of the bakery's production should be arranged. Samples should be taken daily. The program must have the backing, and preferably should have the active participation of top management if it is to be an effective agent in raising quality standards.

The writer cannot vouch for the truth of this story. But it is told that the executives of Horn & Hardart, a firm with an enviable record for the high quality and low cost of their food, daily test, by personal tasting, the coffee served in their cafeterias. Both Mr. Horn and Mr. Hardart, while they were alive, invariably were present at these coffee-tasting sessions, since both believed that the quality of their coffee was largely responsible for the success of the business.

Flavors, Like Martinis—

As part of the attention given to flavor, there could well be some variation in flavor from time to time so as to avoid monotony in the product. The use, for example, of very small amounts of nutmeg in sponge cake makes for a very appetizing and tasty flavor. The proper amount of salt is also essential to the full development of flavor. In all of this, the trick is never to use so much of a given flavoring agent that it is blatantly apparent to the person eating the product. Flavors, like well-mixed Martinis, should be so smoothly blended that the effect is there without the means being evident.

Icings and fillings are particularly adapted to this sort of flavor variation. (While on the subject, isn't there anything else besides apple-raspberry jelly that the baking industry can use for spreading on jelly rolls?)

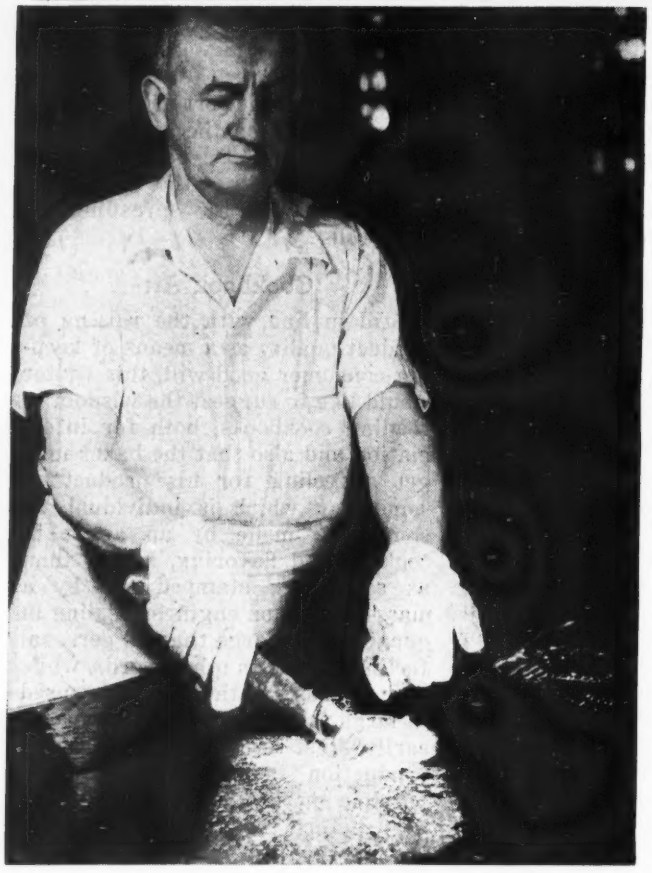
Cookbook Art

Still in line with the raising of product quality as a means of keeping consumer good will, this writer would like to suggest the wisdom of reading cookbooks, both for information and also that the baker may get a feeling for his product as something which is individual, as something made by an artist in cookery and flavoring, rather than as something stamped out by a mass-production engineer dealing in quantities so large that all personal feeling is lost. In other words, while the methods and the equipment used in large commercial bakeries necessarily must be those of the mass-production industries, still every possible means should be taken to keep before the men the fact that cooking and baking is both a science and a highly individualized art.

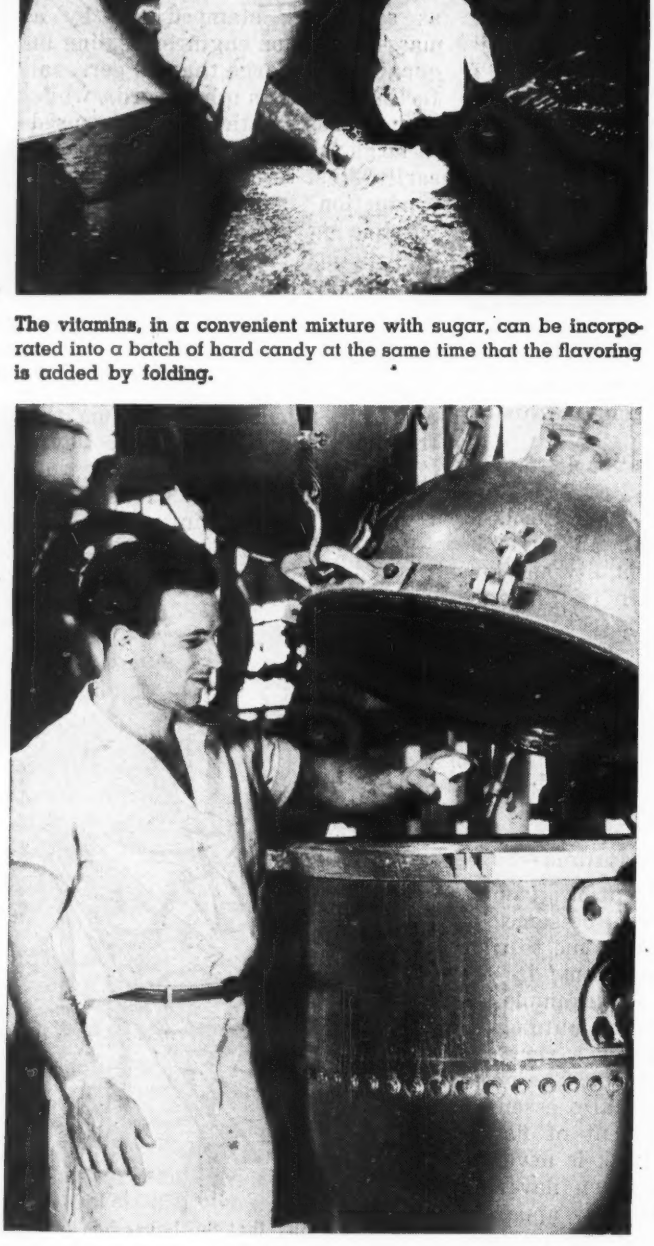
Some of the books that ought to be on the baker's shelf are "Experimental Cookery," by Lowe, which is excellent, though well over on the technical side; Hesseltine & Dow's "Good Cooking"; "Mrs. Appleyard's Kitchen," by Kent; "Cross Creek Cookery," by Rawlings; and the standard authorities like Fanny Farmer's and "The Settlement Cook Book."

(Turn to page 150)

One potent ally that the baker has in his fight to hold onto his new market lies in his own mouth. Let him pay increased attention to the flavor and taste of his product. A definite schedule for tasting samples should be arranged. Samples should be taken daily.



The vitamins, in a convenient mixture with sugar, can be incorporated into a batch of hard candy at the same time that the flavoring is added by folding.



When the vitamins are added to hard candy or to fudge in the kettle, no premixing is required.

Adding Vitamins to Candy

By G. F. SIEMERS

Hoffman-La Roche, Inc., Nutley, N. J.

DOMESTIC production of candy of all types during 1944 is estimated at 2½ billion pounds, of which 50 percent was allocated to the armed forces. Since this figures out at something over 110 lb. per year per man in the services, it is certainly deserving of consideration in regard to nutritional improvement.

The sharp reduction in price and the greatly increased production of pure crystalline vitamins now make nutritional improvement of candy feasible. Fortunately, vitamin addition during candy making is a very simple operation.

Amount to be Added

Inappropriate or excessive addition of vitamins to a food product is not desirable. But foods essentially carbohydrate in character should contain an appropriate amount of the vitamins associated with carbohydrate utilization. No precedent has been established for vitamin levels in candy, but the enrichment levels specified for flour are, in general, approved by authorities on nutrition. These could be adopted for any essentially carbohydrate food. On that basis, with the caloric value of flour about 1,600, and a range of 1,600 to 2,400 for candy, the minimum quantities of Table I are in order. A maximum that is 50 percent greater should be allowed.

These minimum levels are usually reached or slightly exceeded when adding 3.0 to 3.5 milligrams of vitamin B_1, 1.7 to 2.0 mg. of B_2 and 16 to 17 mg. of niacin per pound. Vitamin loss in processing different types of confections varies considerably, but the overages allowed by this addition, plus the natural vitamin content of some of the ingredients, usually will cover the losses in processing and storage.

Since the restoration of a processed food to the vitamin level of the natural ingredients is sometimes used as a guide in determining vitamin-enrichment levels, comparison can be made with the ranges shown in Table II, which are based on each pound of sugar in whole mature Cuban cane stalk or in the cane juice.

Cost

At current quotations of 16 cents per gram for vitamin B_1, 20 cents per gram for vitamin B_2 and $7 per kilogram for niacin, the projected vitamin addition, in-

Table I—Suggested Minimum Content of Vitamins, Per Pound of Enriched Candy.

Vitamin B_1 (thiamine hydrochloride)	2.67 mg.*
Vitamin B_2 (riboflavin)	1.60 mg.
Niacin	16.00 mg.

*888 U.S.P. units.

Table II—Vitamin Content of Sugar Cane and Sugar Cane Juice.

	Whole cane*		Juice*	
	Average mg.	Maximum mg.	Average mg.	Maximum mg.
Thiamine	2.05	17.95	0.50	1.1
Riboflavin	1.1	5.7	0.215	0.4
Pantothenic acid	6.0	38.6	4.4	9.9
Niacin	5.3	52.25	2.0	3.3
Biotin	0.2	0.7	0.08	0.1

*Based on each pound of sugar in whole mature Cuban cane stalk and in the cane juice. (W. R. Jackson, 106th Meeting, American, Chem. Soc.)

to Candies

Candy can be enriched without altering process. Here's how and what it costs

cluding the additional amount required as a factor of safety, will be approximately 8½ cents per 100 lb. of finished candy.

Processing

During the past three years, many commercial-scale experiments in vitamin fortification of candy were run by or with the cooperation of the candy manufacturers. Although some types of candy require careful handling and proper timing in the vitamin addition to prevent excessive loss, no unusual difficulties were encountered. Preparation of "premixes" of the crystalline vitamins with some of the candy ingredients simplifies handling and provides uniform distribution throughout the batch. The vitamin premix becomes only another simple ingredient in the formula.

Chocolate Premix

Chocolate covered bars of the customary 5-cent type, solid sweet and milk chocolate, and the coated pieces containing 40 to 60 percent chocolate, can be fortified by introducing all of the required vitamins into the solid chocolate or into the coating. A premix with a coating-chocolate base which has been successfully used in experimental batches contains 2.392 grams of vitamin B_1, 1.408 g. of vitamin B_2, 12.80 g. of niacin and sufficient coating chocolate to make 1 lb

This premix is easy to prepare. The accurately weighed vitamins are mixed with the proper quantity of molten coating chocolate at 90 to 100 deg. F., and then milled. After milling, the semifluid mixture is cast into 8-oz. molds and cooled. It disperses readily when added to molten coating chocolate in the tempering tanks. No attention is required other than that necessary when making an unfortified product.

Candy containing 50 percent of coating chocolate will require about ¼ lb. of the premix per 100 lb. of coating. If the candy has only 25 percent of coating chocolate, ½ lb. of the premix must be used for each 100 lb. of coating. These percentages will amount to an addition of 2.99 mg. of vitamin B_1, 1.76 mg. of vitamin B_2 and 16.0 mg. of niacin per pound of finished candy.

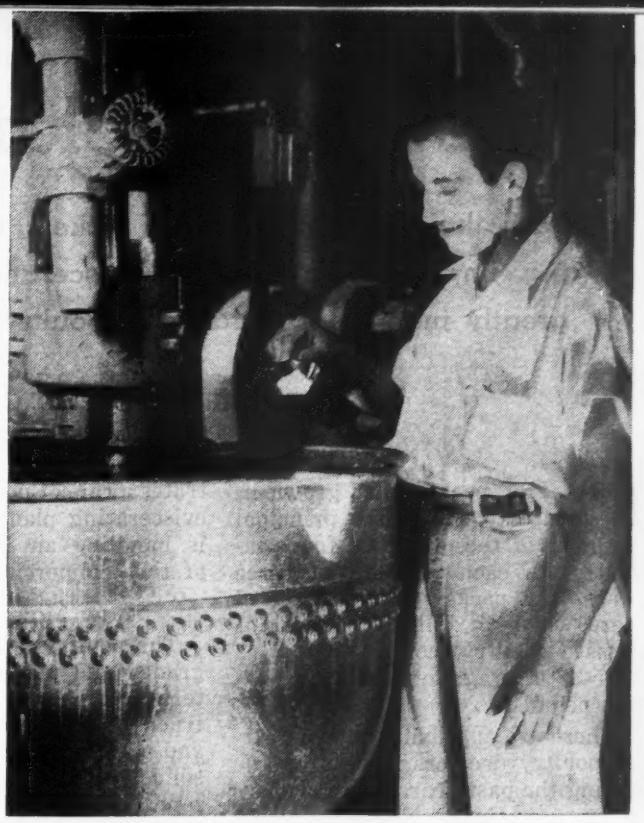
Addition with Fondant

Since the B vitamins are susceptible to destruction by heat, it is always advisable to add the mix as late as possible in processing, but in sufficient time to insure good distribution throughout the batch.

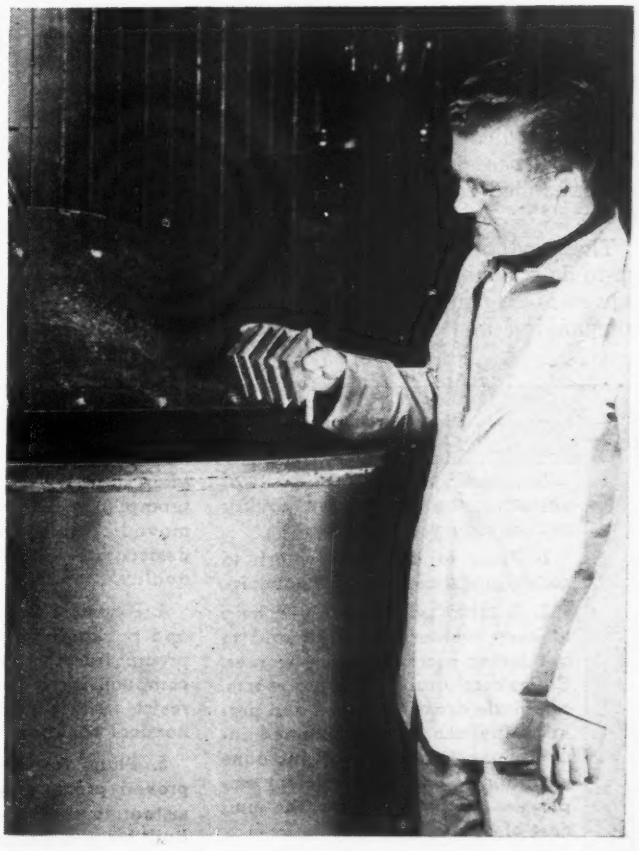
Caramels, fudge and other pan-work goods can be fortified by adding a premix composed of the vitamins and powdered sugar. For convenience, the premix should provide the desired potency in the finished product when 1 oz. is added to 100 lb. of finished candy. The premix is added after the candy cook has reached the proper temperature and the heat has been turned off.

Since a small amount of egg albumen or fondant, or both, must be added to the cook at the end of the heating period, the vitamin mix can be incorporated into one of these before adding to the batch in the pan.

(*Turn to page* 186)



This plant puts the vitamin-sugar mix directly into the kettle for caramels. It can also be added with the fondant, if desired. In any case the premix is added after the batch is at temperature and the heat has been turned off.



The vitamins for 500 lb. of chocolate coating for 2-oz. bars have been prepared in highly fortified bars of coating chocolate, so that they blend quickly and evenly in the kettle.

Poultry Packing Progresses

With the aid of mechanical pickers, overhead conveyors, wax defeathering, improved "on-the-line" eviscerating equipment and better refrigeration, greatly increased tonnages of poultry are packed in spite of labor shortages

By HARRY E. DREWS, Consultant, Arlington, Va.

POULTRY packing has grown in stature to one of the principal divisions of the processed foods industry. In each of the past three years, the packers have produced more than 3 billion pounds of dressed poultry, compared with a 1935-39 average of about 2⅓ billion pounds.

There are approximately 650 car-lot poultry dressers, a gain of 100 during the past year. There also are about 115 turkey dressing plants and more than 3,300 smaller local poultry dressing plants.

The capacity for handling production volume has been expanded in most plants. Some of the smaller ones have moved up into the higher production classification during this period. Equally significant, most plant operators have prospered. But present indications are that the poultry processing industry is not overexpanded except in a few local areas.

The production line of a strictly up-to-date poultry packing plant is represented graphically by the accompanying flow diagram. It illustrates a car-lot poultry dressing and eviscerating plant of the type that is handling an increasing amount of the commercial poultry crop.

Raw Material Control

The poultry is received, weighed, graded and placed directly in batteries, or "live poultry holding trucks," consisting of lightweight and easily cleaned metal cages with solid floors but slatted sides and tops. As a step in raw-materials selection and quality control, fowls and "springs" are placed in separate batteries. Light breeds usually are separated from heavy breeds, and prime stock nearly ready for kill is placed in separate batteries from thin stock that can be fed profitably for a longer period.

From the receiving room the batteries are wheeled to the fattening station, where the poultry is protected from sudden temperature changes and inclement weather conditions. Most car-lot plants have from 150 to 400 fattening batteries, and the poultry is battery fed for two to ten days, depending on the improvement in market quality and gain in weight obtained with that particular type of poultry. During rush periods, the feeding period usually is reduced sharply, and some of the prime poultry may move directly to the kill. Feeding periods have become shorter during the past few years. Because of improved feeding on the farm and changes in breeding, the poultry does not stand up well over a long feeding period.

The feed is poured at frequent intervals into troughs attached to the batteries, so that only fresh feed is before the birds. This encourages heavy consumption and high gains. The feed consists of wet mash which pours easily, usually containing about 70 percent total moisture. About 20 lb. of semi-solid buttermilk per 100 lb. of dry feed is used. This mixture supposedly gives a milk-fattening and bleaching effect on the meat tissue if the feeding period is long enough. The wet mash is mixed mechanically as used. The dry feed mixture used in the wet mixture is previously ground and mixed in a commercial feed mill. The semi-solid buttermilk is added at the time of mixing with water in the poultry plant.

Efficient Processing

When the fattening period is over, the batteries are rolled to the killing and picking room. As the birds are removed from the cages, they are hung manually on shackles suspended from a power-driven, variable-speed overhead conveyor line. As the shackled birds pass the killing station, their throats are cut (without severing the heads) to allow free bleeding. There is a bleeding period of 15 to 130 seconds before the birds enter the scalding machine. As they pass through the scalder, the birds are immersed about 35 seconds in violently agitated water that is under thermostatic control at 128 to 135 deg. F. The water temperature depends on

Postwar Musts for Poultry Packers

In planning to reach his postwar objective, the progressive poultry packer may well develop:

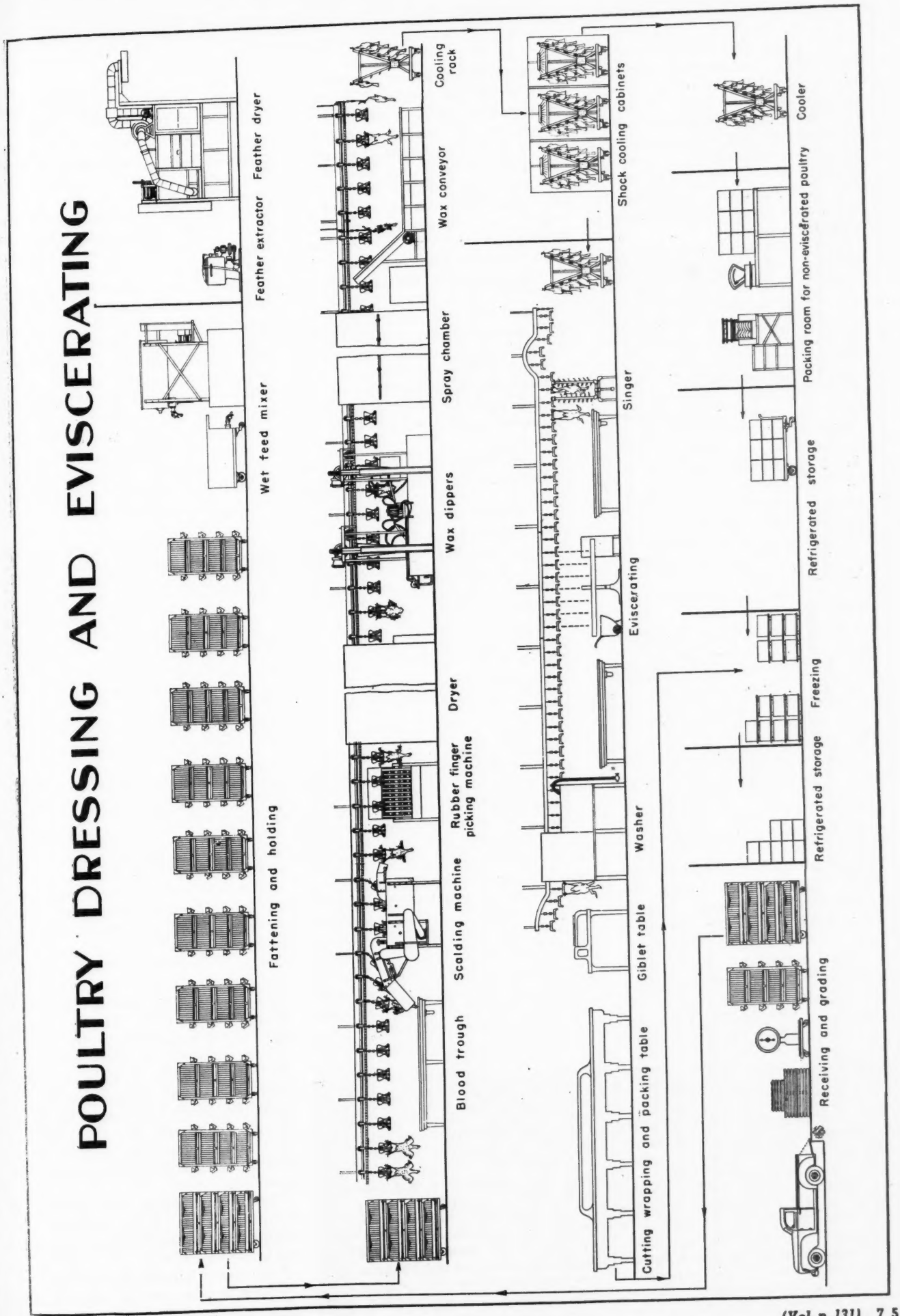
1. Plans for an early return to careful and thorough workmanship.

2. A labor policy that will help to keep workers satisfied and to get better production per worker. Clean comfortable working rooms, adequate dressing rooms and perhaps the use of well-planned incentive systems that will increase earnings of the more efficient employees without raising the unit cost of operation.

3. Plans for good cooling and freezing facilities. The spread of bile taint and off-flavor from the viscera will start within 8 hours after slaughter unless the bird is promptly chilled or the viscera removed. Rapid freezing without desiccation will help to hold prime quality.

4. Plans for improved wrapping and packaging which will permit prompt freezing and which will be compact, have consumer appeal, resist freezer-burn and be economical of labor.

5. Plans for installation of improved processing equipment resistant to rust and corrosion and built for years of continued operation without constant breakdown and replacement. Improved equipment certainly will be available postwar.


POULTRY DRESSING AND EVISCERATING
Fattening and holding
Wet feed mixer
Feather extractor
Feather dryer
Blood trough
Scalding machine
Rubber finger picking machine
Dryer
Wax dippers
Spray chamber
Wax conveyor
Cooling rack
Cutting wrapping and packing table
Giblet table
Washer
Eviscerating
Singer
Shock cooling cabinets
Receiving and grading
Refrigerated storage
Freezing
Refrigerated storage
Packing room for non-eviscerated poultry
Cooler

the plumage development and tenderness. Light-feathered broilers are semiscalded at the lower ranges of temperature, while fowl with winter plumage and heavy roasters and cocks are semiscalded at the high temperatures. When scalding is speeded by moving the conveyor faster, the water temperature is raised.

Most of the feathers are removed from the scalded birds by machine. A single-drum machine with soft rubber fingers, constructed so that the birds may be manipulated against the drum without being removed from the shackles and the conveyor line, is the most popular. Excellent feather removal is obtained by a competent operator. A number of operators may work on one of the larger machines, or several of the smaller machines, with individual operators, may be used. Automatic rubber-finger picking machines with double drums recently have been made available, and their use is expanding rapidly because of the labor shortage. Plant operators using them report varying degrees of success. But the industry is more concerned about the labor shortage than about "barked" and injured birds. The machine probably will be improved and perfected within the next few years.

After the main-body feathers are removed by the picking machine, the birds are conveyed into a cabinet where fan-circulated air at 110 to 120 deg. F. dries excess moisture from the bodies. Then the birds pass to the wax machine to be dipped twice in a special poultry defeathering wax maintained at 132 to 140 deg. F. Cold-water sprays solidify the wax to the point of plastic firmness without making it brittle. Then the wax, bearing with it most of the remaining feathers, is stripped from the birds by operators along the "wax-conveyor" table. The remaining pinfeathers are removed by manual pickers who work along the overhead conveyor line (station is not shown by designation on the accompanying flow sheet). It is the stretch of overhead conveyor between the end of the wax conveyor and the cooling rack on which 180 birds are hung to be rolled into the cooling cabinets or room.

Used wax, containing feathers, is conveyed to a reclaiming tank and remelted. Then the feathers are skimmed off and centrifuged, the reclaimed wax being returned to the dip tank. The melted wax usually is water-washed to free it of dirt and foreign material. Wax loss in the defeathering process usually is not more than 1 lb. for each 100 chickens.

The development during the past five years of greatly improved, all-petroleum, poultry defeathering wax—lighter in color, less brittle, more highly adhesive and capable of being reclaimed with minimum of loss—has been a major contribution to the efficiency of the wax defeathering process and to the speeding of poultry-dressing operations. With the present wax, the body bloom and appearance of the birds is enhanced, and complete feather and fuzz removal is facilitated.

Shock Cooling a Success

Prompt cooling and effective removal of body heat after dressing is essential in maintaining high "table quality." "Shock cooling," as developed by Dr. G. F. Stewart and M. C. Sweet of the Poultry Products Laboratory at Iowa State College, subjects the poultry to a shower of brine at 24 to 30 deg. F. It gives sharp initial cooling of the warm birds and is a progressive step. After shock cooling, the birds are rinsed with water and held in a cooler to equalize body temperatures. A few plant managers plan to install continuous cooling.

Poultry can be eviscerated warm, directly from the picking room. This practice came into commercial use in several plants in 1943 and became more widely used in 1944. In some instances, eviscerating poultry direct from the picking room is made possible by an extension of the picking conveyor line. This reduces the labor of handling the birds.

Prompt removal of viscera should help maintain quality. But heavy, fat fowls are rather oily and greasy when eviscerated without precooling. Also salvaging of edible fat is improved when the bird is cooled before eviscerating. When high standards of attractiveness and table quality again are necessary to effective merchandising, at least a partial, prompt cooling between picking and eviscerating probably will become standard practice in the better plants.

The shock-cooling system indicated in the flow diagram shows insulated cabinets holding one rack each. These are equipped with overhead showers which distribute a coarse spray over the birds on the rack. The brine solution is filtered as it runs from the bottom of the cabinet. Then it passes through a heat exchanger for cooling and is returned to the shower heads by a low-pressure centrifugal pump. A special type of nonclogging spray head is used. Filtration can be accomplished by a gravel or sand filter or by sponge filters. The temperature drop in the solution usually is not over 2 or 3 deg. F. in the course of complete circulation.

The eviscerating room shown in the flow diagram embodies the "on-the-line" operation adopted during 1943 by nearly all eviscerating plants. It increases efficiency and requires less labor compared with the older "on-the-table" system. The birds remain on the shackles of the conveyor line throughout the entire evisceration and cleaning operation. Improved simple shackles of the nonlocking type have been developed. The birds are suspended both by the head and the feet during part of the operation to hold them in a horizontal position for easy inspection.

In a few plants, the operation temporarily is being carried on without the supplementary conveyor table for the viscera. But efficiency of the operation and effectiveness of Federal inspection of viscera are improved by a simple synchronized conveyor table to carry the viscera.

(Turn to page 170)

Coordinated Research Needed

A thoughtfully conceived and coordinated national research program on poultry should be planned and carried through. It should be aimed at solving the broad problems of the industry and should utilize the laboratory and research facilities of the poultry processors, agricultural colleges and Department of Agriculture experiment stations and research laboratories.

The present dried egg research program ("Food Industries", January, 1945, page 99) serves as a precedent. The principles of that program should be applied to other equally important problems in the poultry and egg processing industry. The recent formation of the Poultry Products Research Foundation is noteworthy as a step in the right direction.

Bottling History Made in Hawaii

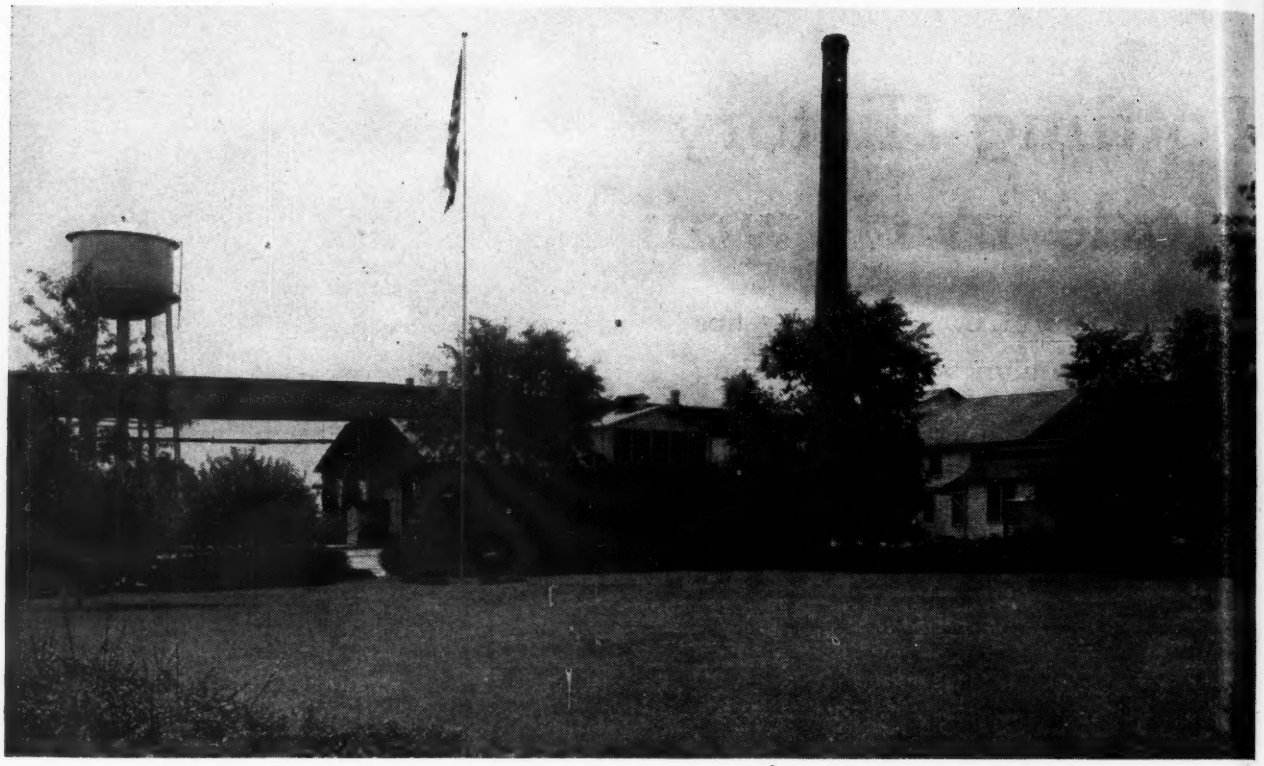
Processors in U. S. can take tips from Hawaiian bottler in building good will with public and employees and in efficient operation*

New showplace plant built in 1942 is an excellent advertisement for the product. It fosters good employee relations, too, since it has air-conditioned offices, a 200-seat recreation hall and separate locker rooms for men and women plant workers and salesmen. There are 275 employees — of 17 different nationalities. The employees are encouraged to engage in all types of sports, and the plant has a champion basketball team (also good public relations).

History in pictures — bottling room in 1875 and now. Said to be the second oldest plant in the U. S., the original factory was started in 1864 and was owned by the English Bycroft's until 1937. The present plant has three complete units which produce 550,000 to 600,000 bottles a day. By operating 22 hours a day, and two Sundays a month, the company keeps up with the increasing demand. The output last year was six million cases, 62 percent being delivered directly to the armed forces and another 18 percent being sold to service men through civilian outlets. In 1937 production was only a little over 170,000 cases.

Part of the fleet of 62 trucks, 2 trailers, 3 high-lifts and 7 low-lifts that make deliveries and handle materials about the plant. In 1937, the fleet comprised 5 delivery trucks. The trailers, of about 950-case capacity, haul to a branch warehouse at Wahiawa, 23 miles away, to serve Schofield Barracks and rural Oahu. In handling materials about the plant, only skip platforms are used. Trailers and large trucks are loaded with high-lifts, and fulls and empties are moved into and out of the plant with gasoline-driven low-lifts.

*From information and photographs submitted by B. J. Eaves, Manager, Coca-Cola Bottling Co. of Honolulu, Ltd.



Building housing the laboratory at Biglerville.

Fruit Processing Improved

Deaeration of frozen and canned apples, controlled continuous blanching, rapid cooling of the canned fruit and improved cold storage are outstanding among many improved food processing technics at Musselman's

By L. CHARLES MAZZOLA, Assistant Editor, "Food Industries."

THIS is a report on 37 years of know-how acquired by C. H. Musselman Co., Biglerville, Pa., in the packing of apples and apple products. By improved technics, this company transformed a feeble beginning into a large-scale successful operation. Outstanding are the deaeration of apples before canning or freezing, controlled steam blanching, rapid cooling of canned apples and improved cold storage. There are other improvements, too. All of these advances are presented in their proper perspective in the following step-by-step discussion of the operations.

Preparation

As they come in from the orchards or from storage, the apples are dumped into washing tanks to remove adhering dirt. Then a grader separates the fruit into two sizes: 2¼ in. and over; under 2¼ in. The larger fruit is peeled and cored in a battery of 29 peelers, each of which is the center of a unit made up of the peeler, the slicer and from four to six girl trimmers and inspectors.

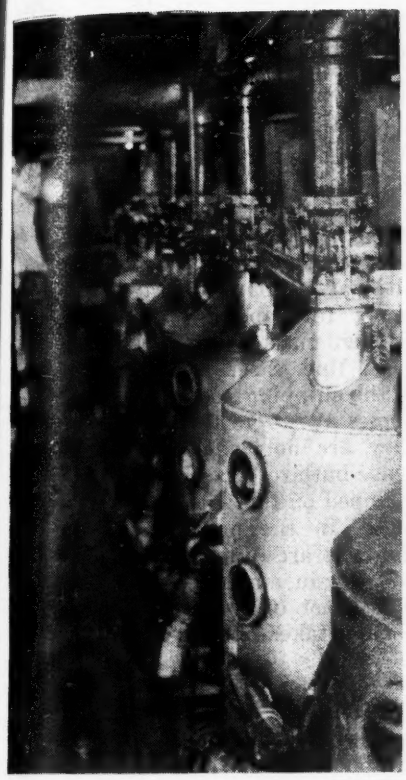
Each peeling machine is equipped with a counter, and the labor unit is paid on a basis which includes not only the number of apples put through but the kind of trimming job that each crew does.

Inspection follows peeling and coring, and the inspection tables are brightly lighted by overhead fluorescent lamps producing 40 to 50 foot-candles of illumination.

After inspection, the apples are sliced, and the slices immersed in a 1 percent salt brine solution for about two minutes. This protects them against darkening due to enzymic action. They are next screened, to free them of small pieces, and dumped onto a series of inspection belts. These belts are lighted by overhead fluorescents which produce 40 to 60 foot-candles of illumination.

Deaeration

The entire apple canning industry found, in its earlier days, that numerous hydrogen swells and pinholing developed soon after completion of the pack. This condition was aggravated greatly in the summer months. It subsequently was discovered that the principal cause of pinholing and hydrogen swells was the air occluded in the porous apple



Battery of stainless steel deaerators used to remove occluded oxygen from apple pieces.

flesh. This discovery led to the development of a number of methods to eliminate occluded oxygen. Unrelated to the chemistry involved, yet part of the problem of producing a satisfactory canned apple, is the elimination of the brittleness of the fruit pieces. This enables the processor to press more apples into the can without breaking them.

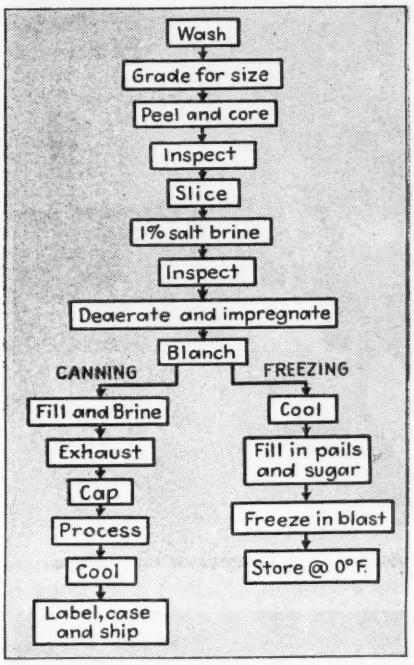
These two problems, while distinct, have been attacked as one. One of the ways of solving them is to submerge the apple pieces in a salt brine solution long enough to replace the occluded air with the brine. This treatment, at the same time, makes the apple pieces enough tougher to prevent their breaking during packing. This particular method still is in use in some plants, but an improved technic is used by Musselman.

If the apple pieces are subjected to a vacuum and a liquid is injected into the evacuated chamber containing the deaerated pieces, the occluded air is replaced by the liquid.[1] For the process to be successful, the temperature and chemical characteristics of the liquid must be controlled.[2]

To do this deaeration job, the company developed and constructed special units of stainless steel. A battery of about 20 of these units now is installed in the Biglerville plant.

Blanching

The conventional blanching of apples, for either canning or freezing, is carried on in a wooden tank filled with water and kept at a temperature close to boiling. But Musselman has developed its own blanching technics, with great success. The company has evolved a continuous steam blancher in which it produces and controls fairly high temperatures (up to 230 deg. F.) Flexibility is provided in the temperature control of the blancher because the condition of the fruit will vary with varieties, seasons, ripeness and conditions of storage. An advantage of this steam blancher is that there is less leaching than in the conventional liquid blancher. Leaching diminishes the apple flavor unless properly regulated.[2]



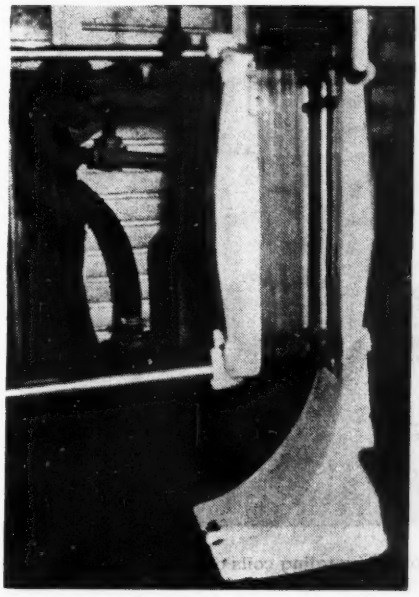
Block diagram of apple canning and freezing processes.

It is in the correct control of these various operations in the processing of apples and apple products that properly trained personnel and suitable laboratory facilities prove their worth. Supervising these operations, with their many variables, and recognizing when a material requires different treatment necessitates special training. Such trained personnel also conceive new technics to overcome difficulties encountered. To be able to recognize what you see—and to know what to do about it—is what it takes.

After the apple pieces have been blanched, they are then ready for either canning or freezing.

Canning

Since the plant at Biglerville is located out in the country where land is not very expensive, the plant, instead of being built up, has been spread over considerable acreage. This type of construction always produces a materials-handling problem. And at Biglerville they have one. It has been solved, however, by mechanical means. Whenever possible, empty cans unloaded from cars on sidings are placed on overhead can conveyors and brought directly to the filling machines. Cases are made up and conveyed directly to casing machines on gravity-type roller conveyors with power-operated booster sections at intervals.

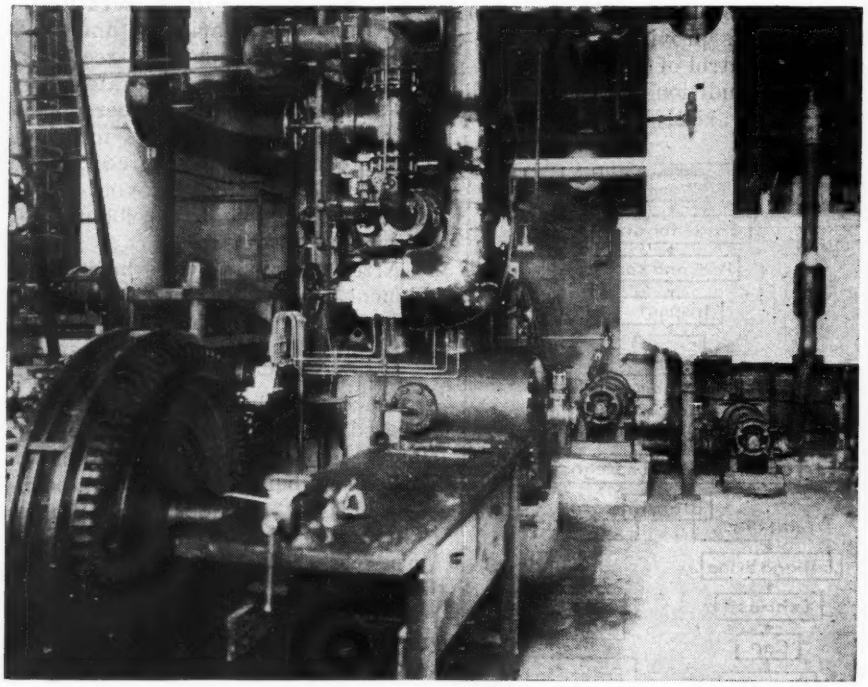


Heat exchanger used to cool the water that cools the apple slices before freezing.

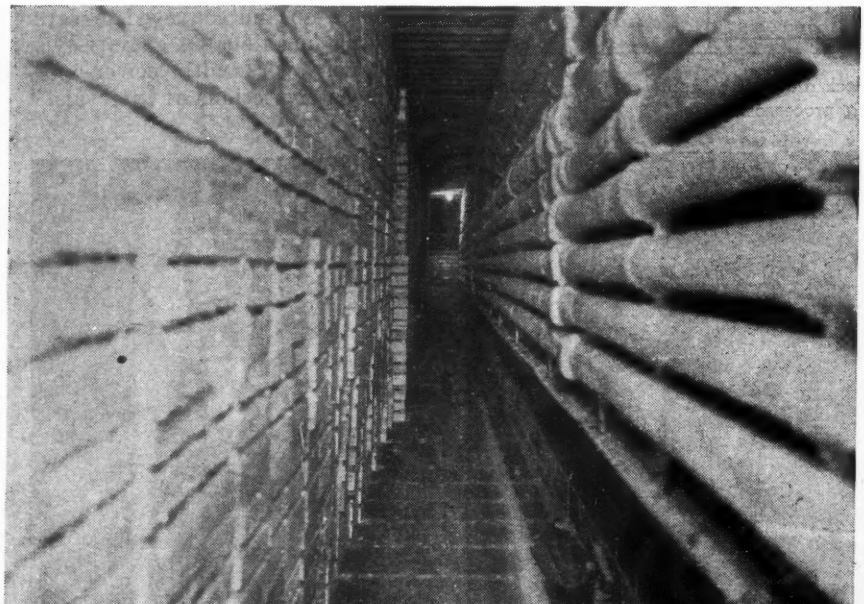
Filling 42-lb. pails with apples and sugar for freezing.

The hot blanched apple pieces are filled into cans with boiling water and are passed through the conventional steam exhaust box. As they come out of the exhaust box, they go through a conventional closing machine. After closing, the cans are processed in a No. 10 continuous retort.

After the cans have been processed, it is important to cool them as fast as possible. The conventional method is to convey the cans through water-cooling troughs in the retort baskets. Most food technologists agree that this method is far from satisfactory. Here again, Musselman has licked the problem. Cooling is done in long troughs, where the cans roll along conventional angle-iron tracks submerged in water for part of their length. The cans are pushed forward whenever necessary by a chain operating below the track and equipped with "fingers" that project above the water. Rotation of the cans as they move along the track speeds cooling, since there is slight agitation of the contents. (This gentle agitation does not break up any of the pieces in the can.) For about the last quarter of the cooling-tank length, the cans no longer are submerged, but travel in the open with cold water spraying on them from above.



Part of engine room at Musselman plant, showing Frick compressor and pumps.



Fruit cold storage room with bank of refrigerating coils on wall.

Labeling and Shipping

After the cans have cooled an additional 24 hours on trays, they are ready for labeling. Cans for the civilian market are labeled on the usual line, cased, sealed and taken to the shipping room. If the canned apples are to go to the U. S. Army, they are not labeled in the usual sense but are "pro-coated" and then stamped on top with the word "Apples." In the pro-coating process, the cans are dipped and then dried on a chain moving counter-current to a blast of hot air. Pro-coating usually takes about two minutes.

Freezing

After steam blanching, the hot apple pieces which are to be frozen are put through a cooling vat. This vat is filled in the morning with water which is used all through the day's operation. It is recirculated through a rotating screen to remove broken apple pieces, and through a plate-type heat exchanger to remove the heat. However, the main reason for recirculating and using the liquid for a whole day's operation is that as the process proceeds the water in the tank is replaced by apple juice. This helps to reduce flavor leaching, thus producing a superior product.[2]

It is interesting to note that in this cooling tank the piping and fittings are of "Saran," which J. W. Beidler, chief chemist at Musselman, says is doing a good job "so long as the temperature of the water does not rise above 180 deg. F."

After the apples have been cooled, they come through on a stainless steel wire belt and empty into a wooden hopper, to the outside of which is attached a small metal hopper which holds sugar to be used in the filling operation. The apples and the sugar are put into 42-lb. fibreboard pails. As the sugar comes out of the hopper, it strikes the metal circular piece used as a cap on the hopper outlet. When lowered, this acts as a disperser, so that the sugar is distributed throughout the pail. The operator alternately puts a layer of apples and a layer of sugar into the pail. The next operator places the

full pail on a scale and adds enough sugar to give a 5 to 1 mixture.

The pail has a paper liner that is folded over to completely enclose the contents. The pail cover is then forced on and the container is ready to go into the freezing room.

Freezing is done in an air-blast tunnel, at —32 deg. F. The pails remain in there for 24 hours, although they become solidly frozen before that time. They are then stored at 0 deg. F.

Outdoor Storage

During the harvesting period, Musselman takes into the plant for processing about 11,000 bu. of apples per day. These include: 6,000 bu. of large fruit for canning and freezing, 2,000 bu. of apples smaller than 2¼ in. for either juice or vinegar, and about 3,000 bu. of orchard runs of mixed or odd varieties, for apple butter. However, this 11,000 bu. is only part of what comes in at the height of the season; therefore, the balance has to be stored.

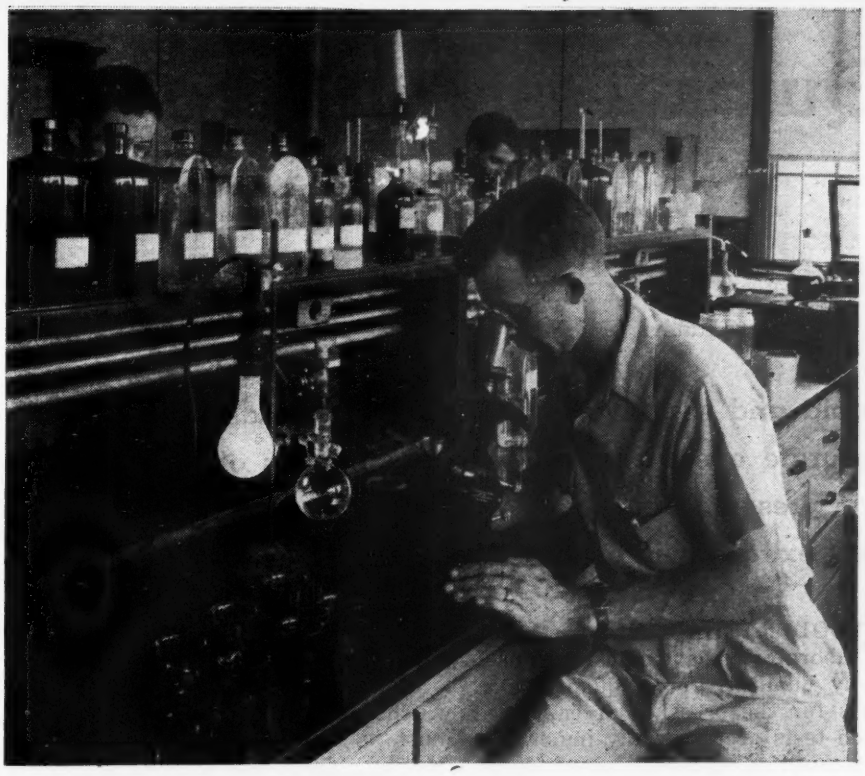
There are two ways of storing the fruit. One is on bare soil outdoors with a protective covering of corn fodder. This protects the apples from the sun during the day, and also keeps them from freezing. In addition, there appears to be enough moisture coming off the ground (and the fodder seems to seal this moisture in) so that the apples are kept in a satisfactory condition, not becoming dehydrated.

Controlled Storage

The more modern method of holding apples is in cold storage under controlled conditions. At Biglerville, Musselman has a 125,000-bu. fruit storage kept at 30 to 32 deg. F. by Frick refrigerating equipment. In conventional cold storage rooms, even though the temperature is controlled properly, the apples seem to show signs of drying in varying degrees. To counteract this drying action, a spray cooler has been installed. Air ducts deliver the humidified air to the far end of the room to produce good circulation. This is necessary not only to maintain uniform temperature and humidity conditions, but to assure an even distribution of the carbon dioxide and ethylene produced by the apples.

Freezing Tunnel

The freezing tunnel measures approximately 57 ft. long x 28 ft. wide by 10 ft. high, and is arranged in two bays. A row of posts stands in the center where the air rises before dividing and passing over two sets of nested coils. There are five blowers of the squirrel-cage type on each side of the tunnel.



Laboratory—J. W. Beidler, chemist, in charge.

The refrigerating coils are joined by large headers running lengthwise of the bunkers and serving as accumulators. Float-valve control is used on the liquid feed. Liquid ammonia is precooled in coils submerged in a bath of liquid in the gas cooler which handles the discharge from the booster compressor. The machine is a 13¼x8 unit with V-belt drive and operates at 400 r.p.m. Connected to the suction side of the booster are also the coils from the low-temperature storage rooms.

Two big new zero-degree rooms have been added to the building, these having a floor area of 83x48 ft. These are used for storing frozen fruits.

The refrigerating load for the blast freezing room, the 0 deg. F. storage rooms, and the 32 deg. F. cold storage fruit rooms is carried by a 10x10 compressor with capacity control and a 6x6 compressor. The larger machine has an unloader to assist in automatic starting, the entire plant being arranged for automatic operation. A 32-in. by 15-ft. shell condenser, electric motors of 30 and 100 hp., two water pumps and three ½-in. electric control valves complete the list of the most important equipment.

Materials Utilization

All fruit 2¼ in. or over in diameter is used either for the canning or freezing operations. Fruit smaller than 2¼in. is used for apple juice stock for jelly or vinegar. The varieties are kept separate for canning and freezing. In the case of apple butter this is not true. Odd and mixed varieties are suitable. It is not necessary to grade the fruit for size. Orchard-run fruit is perfectly satisfactory for this purpose.

Products

The principal items produced by the Musselman company are apples and apple products, cherries and tomato juice. In addition to the Biglerville, Pa., plant the company has a factory at Gardners, Pa., and one at Inwood, W. Va.

Musselman employs between 700 and 800 people at the Biglerville plant alone. Because the company employs many women, most of whom are housewives, it adheres to a 5-day week.

Experience has shown that with a 6-day week the housewives invariably will take one day off, and absenteeism becomes high.

References

1. L. Charles Mazzola, Food Industries, March, 1930, page 112.
2. L. Charles Mazzola, U. S. Patent No. 1,934,810, Process for Canning Apples, issued Nov. 4, 1933.

Quick Test for Peroxidase Aids in Dehydration Control

By E. H. LUCAS, and D. L. BAILEY, Michigan Agricultural Experiment Station
East Lansing, Mich.*

Rapid and sensitive, this test for peroxidase activity is accurate even when only small amounts of peroxidase are present. Deeply colored solutions like carrot and beet extracts will give clear-cut color reactions

FOOD RESEARCH and control laboratories have occasion to use many qualitative and quantitative tests for the presence of enzymes. Such tests are especially important in connection with dehydrated fruits and vegetables. Improved technics which result in saving of time or in greater accuracy are being constantly sought.

It is generally agreed that peroxidase is the most resistant of the enzymes normally present in plant tissues and that measures which inactivate peroxidase also destroy catalase and oxidases. In experiments with dehydration of vegetables and fruits conducted by the Section of Horticulture of the Michigan Agricultural Experiment Station, it was found that the commonly used guaiacol test, as described by Tressler and Evers,[1] is inadequate both because it is slow and because in many cases it is unreliable if only a small amount of peroxidase is present.

A method which utilizes the oxidation-reduction system of 2, 6-dichlorophenolindophenol in an equilibrium with ascorbic acid overcomes these difficulties.[2] The dye is reduced with an aqueous solution of ascorbic acid until the leuco-form appears.

The colorless solution is mixed with the plant extract to be tested and a small amount of hydrogen peroxide is then added.

The reaction is striking, with an immediate change in the color of the extract to varying degrees of blue, depending on the concentration of peroxidase. Weaker enzyme activity is indicated by a slower appearance of the blue color. Extracts not containing peroxidase retain their original color. Since the dye is highly autoxidizable, reactions which take place after 2 minutes must be disregarded. The appearance of a faint blue after that time does not indicate the presence of active peroxidase.

Test Procedure

For dehydrated foods the following procedure has been used with satisfactory results. A 5-g. sample is placed in a Waring Blendor with 100 ml. of distilled water. Approximately 1 g. of precipitated calcium carbonate is added in order to adjust pH. The mixer is operated for 4 minutes. The extract is filtered through qualitative paper. One milliliter of the filtrate is pipetted into a 16x150-mm. test tube, then 1 ml. of a dye-ascorbic acid mixture is introduced by means of a blow-out pipette and 3 drops of a 0.3 percent

Dye-Ascorbic Acid and Guaiacol Test Results for Peroxidase Activity.
Extracts of Unblanched Dehydrated Plant Materials Diluted as Indicated.

Plant extract	Reagent	One volume of original extract diluted with enzyme-free plant extracts 1:0	1:2	1:4	1:8	1:16	1:32	1:64	1:128
Banana	I	inst. +++	10 sec. ++	15 sec. ++	25 sec. ++	30 sec. +	30 sec. +	40 sec. +	1 min. +
	II	45 sec. ++	1½ min. +	2 min. +	2½ min. +	9½ min. +	no reaction	no reaction	no reaction
String-beans	I	inst. +++	5 sec. +++	10 sec. +++	15 sec. ++	15 sec. ++	30 sec. +	40 sec. +	1 min. +
	II	30 sec. ++	50 sec. ++	2 min. +	6 min. +	no reaction	no reaction	no reaction	no reaction
Beet	I	inst. ++++	inst. ++++	inst. ++++	2 sec. +++	15 sec. +++	15 sec. +++	30 sec. ++	1½ min. +
	II	inst. +++	2 min. ++	7½ min. +	no reaction	no reaction	no reaction	no reaction	no reaction
Beet greens	I	inst. ++++	inst. ++++	5 sec. ++++	5 sec. ++++	5 sec. ++++	15 sec. +++	20 sec. +++	35 sec. ++
	II	20 sec. ++	40 sec. ++	no reaction	no reaction	no reaction	no reaction	no reaction	no reaction
Cabbage	I	inst. ++++	inst. ++++	2 sec. ++++	5 sec. +++	8 sec. +++	12 sec. ++	20 sec. ++	30 sec. +
	II	10 sec. +++	15 sec. +++	20 sec. +++	30 sec. ++	50 sec. +	1 min. +	no reaction	no reaction
Carrot	I	inst.* ++++	inst. ++++	inst. +++	5 sec. +++	10 sec. ++	15 sec. ++	20 sec. +	1 min. +
	II	20 sec. ++	30 sec. ++	40 sec. +	3 min. +	no reaction	no reaction	no reaction	no reaction
Cauli-flower	I	inst. ++++	inst. ++++	2 sec. +++	5 sec. +++	15 sec. ++	40 sec. +	1 min. +	2 min. +
	II	5 sec. ++++	10 sec. ++++	15 sec. +++	35 sec. ++	3 min. +	15 min. +	no reaction	no reaction
Cucumber	I	inst.* ++++	inst. ++++	inst. +++	2 sec. +++	4 sec. +++	10 sec. ++	20 sec. +	30 sec. +
	II	4 sec. ++++	10 sec. +++	15 sec. +++	30 sec. ++	1 min. +	2 ½ min. +	no reaction	no reaction
Pea	I	inst.* ++++	inst.* ++++	inst.* +++	inst.* +++	inst. +++	inst. ++	2 sec. +	10 sec. +
	II	inst. +++	inst. +++	5 sec. ++	15 sec. ++	30 sec. +	1 min. +	no reaction	no reaction
Potato	I	inst. ++++	10 sec. ++++	15 sec. ++++	15 sec. +++	15 sec. +++	20 sec. ++	25 sec. +	35 sec. +
	II	10 sec. +++	15 sec. +++	25 sec. ++	1 min. ++	4 min. +	no reaction	no reaction	no reaction
Spinach	I	inst. +++	inst. +++	inst. +++	inst. ++	10 sec. ++	35 sec. ++	1 min. +	2 min. +
	II	inst. +++	10 sec. +++	30 sec. ++	1 min. ++	2 min. +	6 min. +	no reaction	no reaction
Peroxidase concen-trate**	I	inst.* ++++	inst.* ++++	inst.* ++++	inst.* ++++	inst. +++	inst. +++	10 sec. +++	15 sec. ++
	II	inst. +++	2 sec. +++	4 sec. +++	8 sec. ++	30 sec. ++	2 min. +	2½ min. +	5 min. +

Reagents: I = dye-ascorbic acid solution
II = 1 percent guaiacol solution

Color scale: ++++ = very dark
+++ = dark
++ = medium
+ = light

* Reaction with plant extract occurred before the addition of H_2O_2, indicating the presence of oxidases.

** Prepared from potato pulp precipitation with ethyl alcohol.

*Published with permission of the Director of the Experiment Station, as Journal Article No. 667 n. s. 1944.

hydrogen peroxide solution are added.

The reagent is prepared by the addition of an aqueous solution of ascorbic acid (50 mg. in 100 ml. of distilled water) to an aqueous solution of sodium 2, 6-dichlorobenzenoneindophenol (200 mg. in 1,000 ml. of distilled water) until the color disappears. Depending on the number of samples to be tested, the original amount of dye solution should be between 25 and 50 ml. This amount of dye is reduced by small quantities of ascorbic acid solution, conveniently introduced from a burette. A blue shade which occasionally appears in the reagent is removed by the addition of a drop or two of ascorbic acid solution.

The table presents the results of peroxidase tests on dilutions of various plant extracts by the dye-ascorbic acid procedure and the guaiacol method, respectively.

The authors are aware that high concentrations of iron salts in water will produce a blue color with the reagent; therefore precautions must be observed in the use of tap water. This was true of the tap water from the authors' laboratory when tested with the reagent. However, the amount of interfering substance adhering to plant material washed or blanched with this water was found too small to cause a reaction.

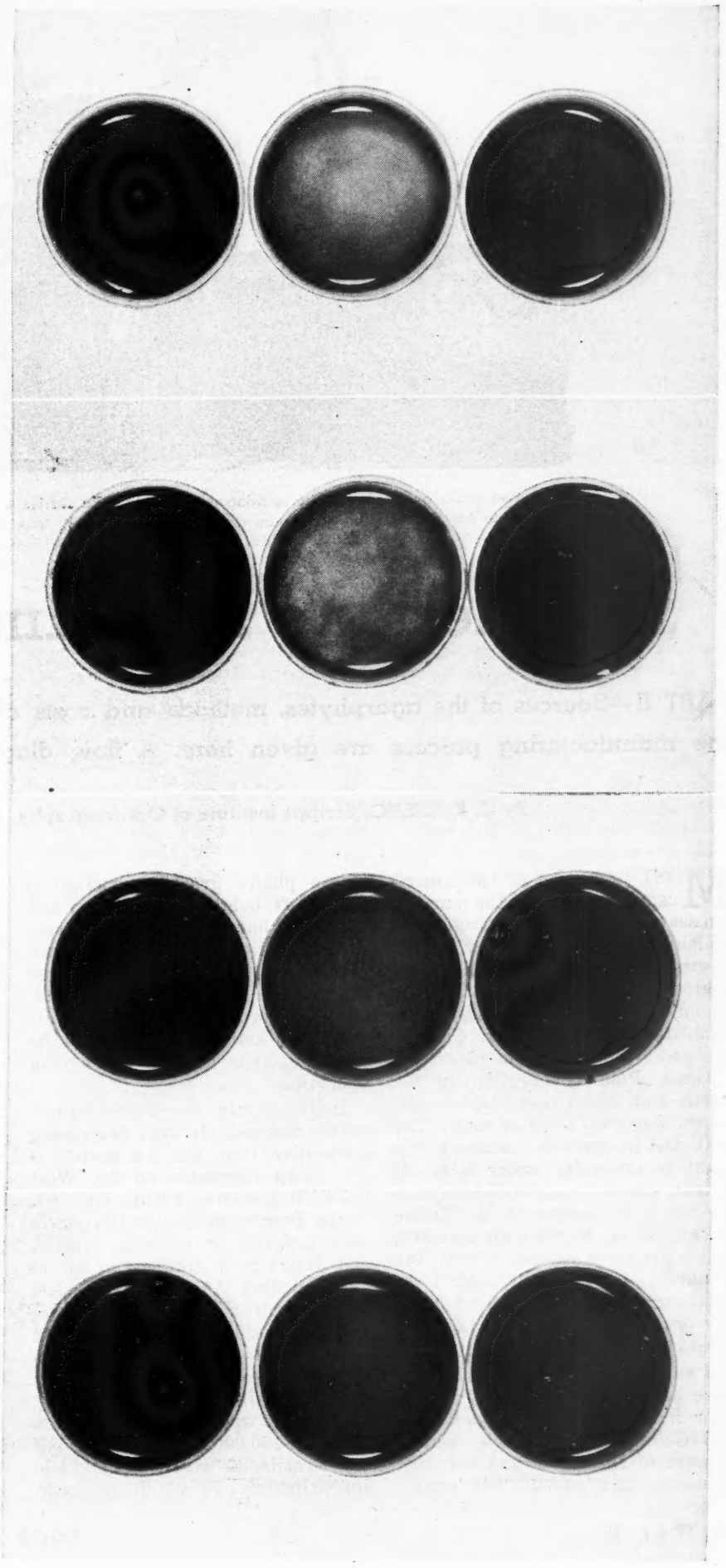
Summary

The advantages of the new test in comparison with the guaiacol method may be summarized as follows:

1. It is more reliable since the sensitivity of the reagent is greater, and the dye color more easily observed, particularly in colored solutions.
2. It is more rapid.

References

1. D. K. Tressler and C. F. Evers, "The Freezing Preservation of Foods," Avi Publishing Co., New York, N. Y., 1943.
2. E. H. Lucas and D. L. Bailey, A Simple, Rapid Quantitative Method of Assaying Peroxidase Activity in Dehydrated Vegetables and Fruits, Michigan Agricultural Experiment Station Quarterly Bulletin, vol. 26, No. 4, May, 1944.



Typical test results. Center dish in each set of three shows the extract before testing, the left-hand dish shows the dye-ascorbic acid test and the right-hand dish shows the guaiacol test, both after 20 seconds. The conspicuous differences in color do not show up in the black and white prints, but in every case the dye-ascorbic color is more definite. The extracts above, from top to bottom, are cabbage, carrot, pea and beet. In the case of beets the guaiacol test shows very little change, while the dye-ascorbic method yields a very dark, almost black, shade if peroxidase is present.

Diver going over side of boat to bring up agarweed. He carries a "basket" in which to put his harvest. One diver can gather as much as 1½ tons of Gelidium a day.

America's Agar Industry

PART II—Sources of the agarphytes, methods and costs of harvesting, and details of the manufacturing process are given here. A flow diagram illustrates the process

By C. K. TSENG, Scripps Institute of Oceanography, La Jolla, Calif.

MOST important of the American agarphytes is the maroon-red seaweed *Gelidium cartilagineum*, which is the true "agarweed." While it grows quite well in the Monterey region of central California, it is found in commercially harvestable quantities only in southern California and Baja California (Mexico), between Point Conception in the north and Magdalena Bay in the south. Reported to grow more than 4 ft. tall in extreme instances, the plant is generally under 3 ft. in height, and is considered harvestable when it reaches 18 in. Unlike the giant kelp, *Macrocystic pyrifera*, which grows in extensive beds, the Gelidium is generally found in small concentrations, localized on the top, or at the edge of rocks in places where the tidal current is strong.

Two other species of Gelidium have been used occasionally in the agar industry, *Gelidium nudifrons* and *Gelidium arborescens*, which, because of their thin and hair-like filaments, are called "hair-agar." These plants grow in bushes to about 3-ft. height in deep water and must be harvested by submarine divers. While slightly inferior, both plants are considered good agar sources. Due to their sparse growth, they seldom are found and usually are mixed indiscriminately with the principal agarphyte in the drying operation.

In California, *Gracilaria confervoides* was used in agar processing for a short time, but this variety is not being harvested on the West Coast at present (Tseng, 1944 *b*). In the East, however, the Gracilaria agar industry is growing rapidly, and last year's production, up to and including August, has reached 25,000 lb. Prior to this period, there was from 1,000 to 1,500 tons of green *Gracilaria confervoides* gathered near Beaufort between Aug. 1, 1943, and Jan. 1, 1944 (Humm, 1944). This was estimated as equivalent to 150,000 to 200,000 lb. of dry Gracilaria, which would yield approximately 50,000 lb. of agar. According to Humm, commercial quantities of this variety also have been located in the Indian River (Florida).

Gracilaria confervoides grows in an entirely different environment than *Gelidium cartilagineum*. It prefers sheltered bays, especially near river estuaries, where the water is shallow, nitrate and phosphate contents of the water high, and water movement very sluggish. Harvesting is not so difficult. It is done at high tide by raking from a boat and at low tide by hand picking. One man easily can rake a ton of fresh Gracilaria during low tide. A ton of sun-dried Gracilaria is worth an estimated $120, but it requires 7 tons of the fresh plant, as compared to 3 tons of fresh Gelidium, to produce 1 ton of sun-dried material.

Harvesting

Gelidium is harvested by divers in California. Working in shallow depths, they hand pick the plant. Raking is rarely done in this re-

gion, being possible only when the water is extremely calm and when the Gelidium grows near the surface. Before the war, a crew of Japanese harvesters, experienced in raking seaweeds, gathered tons of this agarphyte from San Pedro Breakwater.

Agar diving boats usually are small (about 26 to 30 ft. long). They are equipped with a compressor and heavy rubber hose to supply air to the diver and ordinarily are manned by a crew of three: boat operator, diver and life-line tender.

As the Gelidium grows only in relatively small concentrations, mapping its location is impracticable. Agar divers, therefore, have to search for favorite spots where there is a good growth. Gelidium growths are readily noticeable to experienced divers because of the perpetual presence of the bryozoan Membranipora. Experienced agar harvesters also claim that there may be good growths of Gelidium wherever the "goldfish" garibaldi is found.

Working around the edges and the slanting surfaces of rocks in places where the water generally is turbulent and its movement is fast, agar divers have to crawl from one rock to another, occasionally holding to large kelps for support. The diver carries a basket made of small ropes into which he puts the agarphyte as he pulls it from the rocks. When the basket is filled with 60 to 70 lb. of agarweed, the life-line tender pulls it to the surface and lowers an empty one. Working during the morning, when the sea is calm, an experienced diver remains under water for one to two hours, then comes up for a rest period. Divers average four to six hours a day in underwater work, and under best conditions, a diver can harvest as much as 1½ tons of fresh Gelidium a day.

Most divers have to furnish their own suits, which last for approximately 20 divings.

Agar harvesters operate under two systems in southern California: (1) The agar company furnishes the facilities and pays the harvesters $85 per fresh ton. The company takes care of drying, baling and trucking to the factory. Earnings of the boat crews generally are divided into five shares, the diver getting three and the boat operator and life-line tender one each. Boat maintenance and operating costs are taken care of by the company. (2) The crew provides the boat, and the members harvest, dry, bale and sell the agarweed. Of the proceeds, the diver gets half, the boat operator and life-line tender one-sixth each, and the remainder is allocated to boat maintenance. Current prices for a ton of sun-dried Gelidium range from $350 to $400, and it requires about three tons of fresh "agarweed" to make a ton of sun-dried material.

Since diving operations are carried on in rather shallow waters (15 to 30 ft. deep), underwater work is done only when the water is calm and without strong ground swells. In southern California, most diving is done during the summer and fall. There are, on the average, 100 to 120 days during the year when the ocean is calm enough. May to November is the most favorable period.

The American Process

The present process of manufacturing Gelidium-agar in America is nearly the same as that devised by John Becker. Bleaching of agar with hypochlorite is done, as present, only by the San Diego concern. This process is costly, and while it improves the color, some agar manufacturers are uncertain as to its effect on gel strength.

The first step in processing the sun-dried, unbleached Gelidium is a thorough washing and soaking for 12 to 14 hours. The ratio of fresh water added to the agarphyte is largely dependent upon its quality—usually 1 gal. to a pound. The material is then transferred to pressure cookers, or digesters, and heated by steam at a pressure of about 15 lb. per square inch (a few plants use open kettles). It is cooked for 6 hours in a dilute agar solution obtained from the third and final cook. The partly spent agarphyte receives two more extractions, 8 and 12 hours, respectively, before being discarded as waste.

The extract is then clarified with filter-aid and filtered through an ordinary filter press. The clarified solution is poured into open tubs, where it gels firmly in about 24 hours at room temperature. The gel is fed through a chopper, drop-

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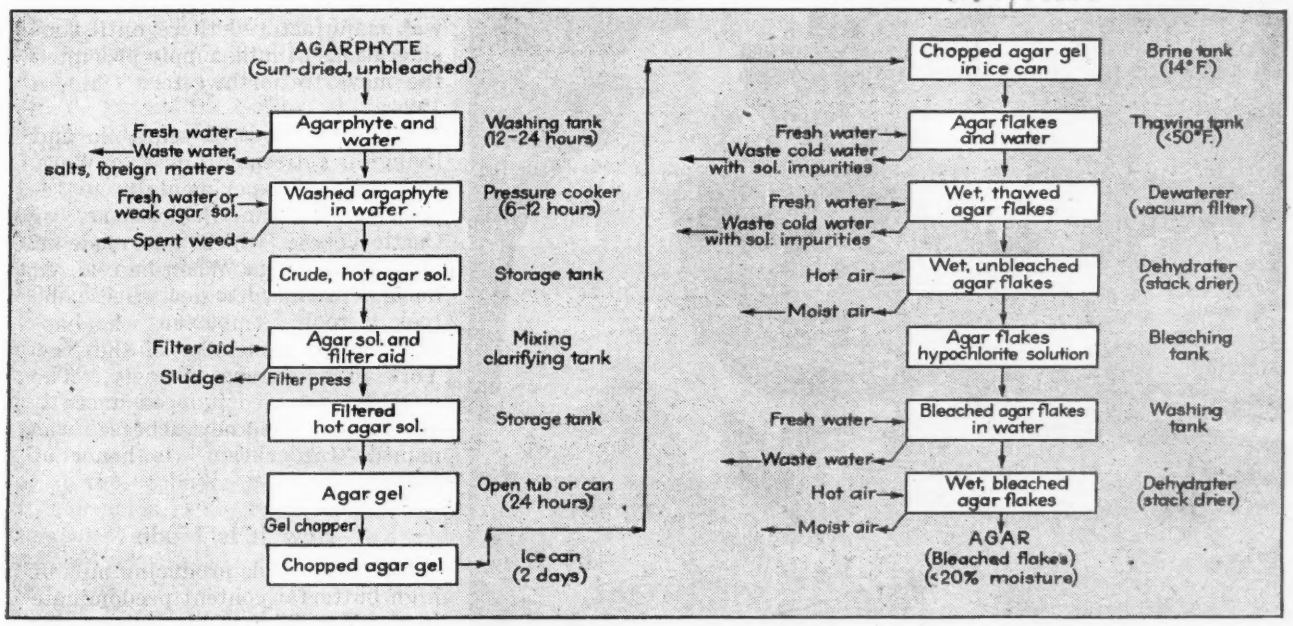


Flow diagram of the American process of agar manufacture, as used in California. The bleaching part of the process is used by only one concern.

Art and Technology Team Up On Liederkranz

Some skilled operation is required on every batch, every day of the 25-day delicate process. This art of veteran cheesemakers is combined with scientific control to produce a food for epicures.

By JOHN M. JOHNSTON,
"Food Industries," Cleveland, Ohio.

The finished cheese is wrapped in parchment paper and metal foil, then labeled. Six pieces are packed in a wooden box which permits breathing and enables normal ripening to proceed enroute to the retail store.

CLOSE quality control in a product whose manufacture is as much an art as it is a science requires particularly strict attention to those operations which are accurately measurable. The judgment of veteran trained men still must be depended upon in those processes of production which remain an art.

The conditions are especially challenging in the manufacture of Liederkranz cheese, a product of The Borden Cheese Co., Division of The Borden Co., at its plant in Van Wert, Ohio. Here many of the daily steps in the production of this epicurean cheese must depend on human judgment as a supplement to accurate scientific control of the basic milk supply and the basic methods of handling milk.

Liederkranz is the registered trademark for a soft, rind-ripened cheese, and it shares with Brick and cream cheese the distinction of being an original American contribution to the world's family of cheeses.

Incidentally, it is a leading contender for daily attention, because some operation is required in its production each of the 25 days from the time the milk is received at the Van Wert plant until the cheese is sufficiently cured to ship to the distribution trade.

Discovered in 1892 by Emil Frey, then a 20-year-old apprentice in a Monroe, N. Y., cheese factory, it was manufactured there until considerations of milk supply prompted the move to northwestern Ohio in 1926.

Mr. Frey, now 76 years old and living in retirement in Van Wert, was seeking experimentally to reproduce German Schlosskase, or Castle cheese, which was made in northern Austria. When he realized he had produced a new cheese, he took it to his employer, who happened to be a member of the New York Liederkranz Society. The members sampled it, pronounced it good, and the new cheese was named "Liederkranz" in honor of the society.

Emil Frey, discoverer of Liederkranz, at Van Wert factory. Draining forms are seen in foreground and background. Mr. Frey made his discovery in 1892 when, as an apprentice in a Monroe, N. Y., cheese factory, he was trying to make German Schlosskase.

How It Is Made

Guernsey herds producing milk of high butterfat content predominate in the Van Wert, Ohio, community where the plant is located. The summer-winter range from these herds is milk containing from 3.9 to 5.2 percent butterfat.

The milk is graded carefully for

odor, flavor and acidity at the receiving platform, since the heart of the manufacturing problem is to have a supply of such quality that uniform procedure will produce a consistent product.

After pasteurization, by the flash process, the cooled milk is heated to the desired temperature, and rennet is added. Production officials at Van Wert express a preference for powdered rennet because of its keeping qualities.

The curd which forms is handled very gently and is dipped into metal draining forms when ready. The bottomless, rectangular forms are placed on reed mats, which speed up, and make more uniform, the whey drainage from the curds. These mats, employed repeatedly in the ripening process, are woven in the plant by skilled workmen, so that quality and uniformity can be obtained. They are washed, sterilized and dried after each operation.

The drainage of the whey requires two days, during which the block is reversed four times. The third day the block is salted and shifted to a tray of ½ in. mesh cane.

The cheese then goes to the salting room for several days, where it is kept on basswood boards, as each block is turned and salted daily on the outside surfaces. This operation removes the film of growth, an operation requiring a high degree of skill and judgment.

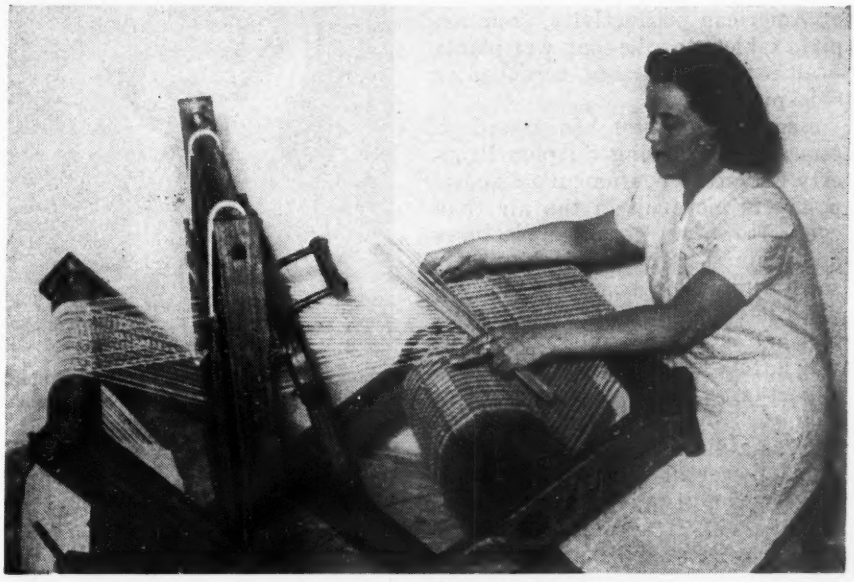
The exact chemical and biological nature of the agents responsible for the curing of Liederkranz cheese is not known, but it is evident that the ripening process extends from the outside toward the center. This can be observed by cutting cheeses at various stages of curing. A change in color from chalky white to creamy yellow and a change in consistency from firm and brittle to soft and creamy are most noticeable.

The biological agents, of which there are several, develop in a mixed culture and are applied externally, as with Brie and Camembert. Extreme care in controlling temperature and humidity make it possible to keep these agents growing to the exclusion of many undesirable molds ready to develop the moment vigilance is relaxed.

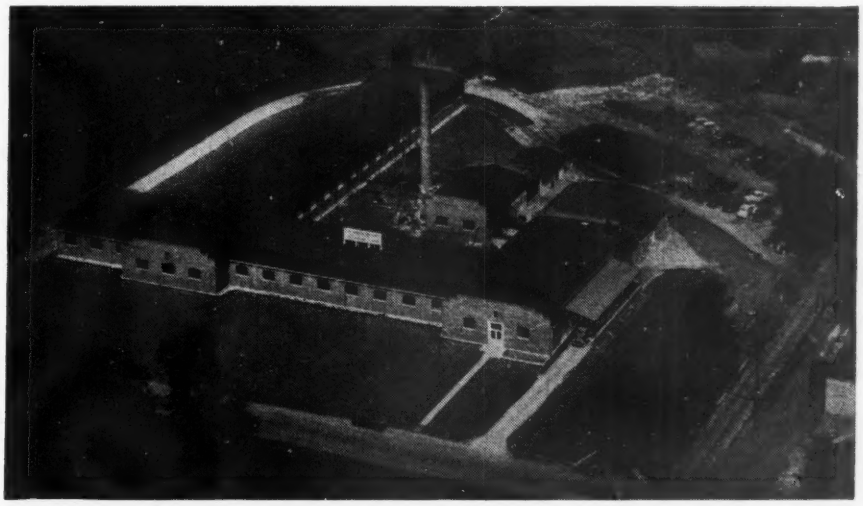
After several days in the salting room, the original cheese block is cut into 12 pieces, each of 4 oz. (experience has indicated that this size is most favored by consumers). A percentage of the 48-oz. bricks are cut into 1½-oz. portions which

(Turn to page 148)

Curing room. Each piece of cheese is covered with a reed mat while it develops its characteristic flavor.



Weaving the reed mats used in curing Liederkranz. These mats, employed repeatedly in the ripening process, are woven in the plant by skilled workers so that quality and uniformity can be obtained.



Borden Liederkranz factory at Van Wert, Ohio.

POINTERS ON SURPLUSES

There is $20 billion of government-owned plants, properties and products to be sold when no longer needed for the war effort. Here is a chance for food processors to get modern buildings and general plant equipment at use prices

By CARROLL M. SEXTON, Research Institute of America, New York, N. Y.

THIS war has made our government the world's biggest buyer. War's end will make it the world's biggest seller. It will have a stock of more than $100,000,000,000 worth of thousands of different items, most of them in tremendous quantities, representing the whole wide range of American productivity, from aspirin tablets to mile-long war plants —all to be sold, leased, scrapped or stockpiled.

Because Congress has passed an especially confusing Surplus Property Law, the government's disposal policy is more up in the air than ever. However, the manufacturer and business man must decide pretty soon what their basic attitude toward leftovers will be. The problem has half a dozen angles. To some, war leftovers will be a new business opportunity or a cheaper source of supply. To others, they shape up only as a disposal nuisance. To still other powerful groups, they loom largest as a disquieting competitive threat.

Improvement and expansion of the present inadequate surplus disposal setup has to wait until the new Surplus Property Board is functioning. This lull before the storm is a good chance for the business man to get his internal organization in shape for buying, selling or otherwise influencing the surplus market. He should stimulate his purchasing, production and engineering departments to think in terms of leftovers. Many leftover items may at first appear unsuitable for use or resale, but further examination frequently shows that they readily can be adapted.

A good recent example is surplus canisters for gas masks. These were generally passed up until someone got the idea of reselling them as mothball containers to hang in clothes closets.

What Is Surplus?

"Surplus war property" is any type of property conrtolled by a government agency and determined by

Dynamic Maury Maverick, who is leading small business in the battle of surpluses.

that agency to be in excess of its needs. This means that property which is "idle" or "excess" for a war contractor, or even for a major division of a government agency, doesn't become "surplus" until so declared by that agency. The narrow scope of this definition is best shown by the fact that the government has been compelled to set rules for the disposition of termination inventories and other unrequired commodities *before* they become surplus.

The best way to avoid confusion is to speak of *excess* property when referring to leftovers which have not been declared surplus. Thus, if a manufacturer buys steel directly from the X contracting company whose construction project has been canceled by the War Department, he is buying *excess* property. However, if he buys the same steel after the War Department has taken title to it, declared it "surplus" and turned it over to an RFC subsidiary for disposal, the manufacturer is buying *surplus* property. Since a single term is obviously needed to refer to both excess and surplus property, the Research Institute has adopted the word "leftover" to stand for both types of property.

By ignoring the distinction between merchantable and nonmerchantable property, and by lumping surpluses located abroad with domestic leftovers, the size of the surplus disposal problem can be more than doubled. In line with these distinctions, a reasonable estimate of the magnitude of the surplus disposal job at the end of the war will start with a total of close to $104,000,000,000, but will wind up with a final figure of $20,000,000,000 or less. Here's how it's done, using official government estimates:

1. Total leftovers of $104,000,000,000 break down into $65,000,000,000 of materials, components, finished goods and other supplies and $39,000,000,000 in plant, facilities, equipment and real estate.

2. However, of the $65,000,000,000 in supplies, $45,000,000,000 in combat ordnance and other military items is chalked off as unsalable except as scrap. Of the remaining $20,000,000,000, $10,000,000,000 is crossed out because the items are located abroad and, under the terms of the Surplus Property Act, can't be imported. This leaves the more manageable total of $10,000,000,000 in merchantable supplies located in this country.

3. Similarly, of the $39,000,000,000 in leftover plant facilities and real estate, purely military installations account for $23,000,000,000, leaving $16,000,000,000 in industrial property. But only $10,000,000,000 of both these categories is figured to be both salable and located in the United States.

All this adds up to approximately $20,000,000,000 in all types of leftovers that may be offered for sale in the United States.

The purchaser should be on the lookout for specific figures on the particular types of leftover in which he is interested. These figures frequently are available, even though not widely publicized. He should check with his Industry Advisory Committee to see if estimates have been given to it. If not, he should urge the immediate preparation of

these figures by the appropriate disposal agency.

Who Sells?

The Surplus Property Act follows the practice of distinguishing between owning and disposal agencies. There are now eight disposal agencies that sell leftovers declared to be surplus by owning agencies. However, the latter still are empowered to sell: (*a*) Termination leftovers; (*b*) scrap and salvage; (*c*) leftovers located outside the U.S.A. in areas where there is no disposal agency representative, and (*d*) nominal quantities of surpluses—defined as substantially similar surplus items at one location whose cost (estimated if not known) does not exceed $2,500.

Most important of these leftovers are, of course, those arising from contract termination. Billions of dollars of such leftovers will be sold before U. S. war accounts are squared. Buyers of these deal directly with either private war contractors whose contracts or subcontracts have been canceled, or with owning agencies like the Army, Navy or Maritime Commission. On the other hand, when the manufacturer wants to buy real honest-to-goodness surpluses in more than nominal amounts, he has to go to the disposal agencies.

Administration of the new act is not likely to make any drastic changes in the responsibilities of the present disposal agencies, which are as follows:

1. *Treasury Department Procurement Division:* Consumer goods (other than food), plus surplus property of all kinds located in Puerto Rico, Hawaii and the Virgin Islands.
2. *Reconstruction Finance Corporation* (which may act directly or through any of its subsidiary corporations): All capital and producer goods, all real property except that assigned to the Maritime Commission, National Housing Agency and Federal Works Agency plus surplus property of all kinds located in Alaska.
3. *Maritime Commission:* All maritime property.
4. *Navy Department:* Combat ships or naval auxiliaries.
5. *War Food Administration:* All surplus food.
6. *National Housing Agency:* Surplus housing property other than that under the control and jurisdiction of the War Department or Navy Department.
7. *Federal Works Agency:* Surplus war property of the class of facilities financed through FWA other than those located on the sites of housing projects.
8. *Foreign Economic Administration:* All surplus property located outside the continental United States, its territories and possessions, except commercial ships of more than 1,000 gross tons.

The manufacturer can get a more specific item-by-item breakdown of the property, materials and products assigned to each disposal agency by examining the Appendix to Surplus War Property Administration Regulation 1. Copies of this commodity breakdown will be found in the Research Institute's Business Control Coordinator, or may be obtained by writing to the Government Printing Office in Washington, D.C., or from regional offices of any of the disposal agencies listed above. Each agency already has, or will, set up branch offices for the handling of local inquiries. It's wise to establish early contact with the nearest offices of the agencies the business man plans to deal with.

Who Can Buy?

There is still a way to go before business gets a detailed picture of just how, when and where the government's surplus goods will be released. Government agencies have first pick of government-owned leftovers. Under the Act, the Surplus Property Board must offer Federal agencies the right of "first refusal"; and State and local governments have second call on many types of property. In the past, a similar requirement has meant that all Federal agencies had to be notified before surplus government property could be offered for sale to the public. This has led to considerable delay, with clearance by all agencies taking up to 10 months in some cases.

The speediest outlet for most types of leftovers is distributors, who are, therefore, in a key spot to get favored treatment. They can manage larger quantities and cover larger areas than most manufacturers or retailers. They can usually pay higher prices than manufacturers, and while they must buy below the retail level, only a few large retailers can compete with them in the amount of leftover business they can handle. These are natural economic advantages that place the distributor in "first row center" for leftover disposal.

Big business at all trade levels has a similar objective advantage in acquiring most types of leftovers. It can buy large lots, pay cash easily, move products faster. This preferred position is most glaring in the case of surplus war plants. Obviously, the 20 giant war factories which have cost the government an average of $100,000,000 each aren't going to be tidbits for small firms, despite official statements that these plants will be split up "wherever possible".

Helps Small Business

Under the dynamic leadership of Maury Maverick, small business is fighting vigorously to overcome this natural head-start of big business. Its pressure has shown results. Small business can count not only on equal rights but, in many cases, preferential treatment. Thus, the Surplus Property Board is required to determine the smallest size in which different types of surpluses may be sold in various areas of the country. Property in each class and area must be sold in a way that will give purchasers of these minimum quantities preference over purchasers of larger amounts.

Business Should Participate

Regular trade channels are the hardy perennials of surplus disposal. They are to be used as far as is practicable. Sales are to be handled so that they will not disrupt normal business. Speculators and promoters are to be barred.

But it is almost impossible to agree on what is "regular" and who is a "speculator". Leftover brokers, already mushrooming all over the country, claim they are in a "regular" line and are beginning to do a thriving business. Nor is it hard to glorify speculation as "risk capital." Just as efforts to bar new-comers from reconversion have bogged down, it is equally likely that there will be plenty of spots in the surplus picture for adventurers.

Established business can minimize this development only by discarding its lackadaisical attitude toward surpluses. Many sectors of the business community have not realized that the best way to overcome the competitive threat of war surpluses is to participate actively either in their disposition or in joint efforts to withhold them from the market.

More important, the Smaller War-plants Corp. is specifically empowered to purchase any surplus property for resale (usually in smaller lots) to small business for cash on credit, or in exchange for other property. Such purchases by SWPC are given priority over all types of nongovernmental purchases. Similarly, SWPC can make or guarantee loans to small businesses for the acquisition, conversion or operation of plants and facilities that have been determined to be surplus property.

Regional interests will not be neglected. While buyers near the site of surpluses have a definite freight differential advantage, undue geographical concentration or surpluses will lead to charges of regional favortism. This makes some form of equitable geographical distribution of leftovers pretty certain.

Former owners and tenants get preferential treatment in the disposition of surplus real property acquired by any government agency since 1940. Under the Surplus Property Act, the former owner is entitled to repurchase his property, at either the acquisition price or the current market price, whichever is lower, if it is not required by any Federal agency. If the original owner does not exercise this option, any tenant at the time of acquisition is next in line.

War Plants

Policies for the sale or lease of surplus war plants are probably more uncertain than those of any other aspect of the disposal problem. The Surplus Property Act accentuates this uncertainty. It makes further delay unavoidable by requiring review of most war plant sales by Congress and the Department of Justice.

A list of plants and plant property owned by the Defense Plant Corporation now is available. This so-called "briefalog" groups plants by state. It also includes names of the regional representatives who should be contacted if the buyer is interested. For the list, write to Industrial Facilities Section, Defense Plant Corporation, Washington 25, D.C., or inquire at a local RFC office.

Whenever any disposal agency begins negotiation for the disposition to private interests of such property, it must promptly notify the Attorney General of the proposed disposition and its probable terms or conditions. Within 90 days after receiving such notification, the Attorney General is to advise SPB and the disposal agency whether the proposed disposition will violate the antitrust laws. The fact that no advice is received from the Attorney General within the stipulated period does not prevent subsequent antitrust prosecution. Therefore, the purchaser should clear with the Department of Justice whenever there is the slightest doubt about his antitrust position.

Favor Negotiation

While negotiated deals, sealed bids and open auctions are all being used in selling leftovers, the tide is running strong in favor of negotiated sales. The Surplus Property Act permits sales to be made without regard to any existing legal provision for competitive bidding. The law also contains a specific clause releasing disposal officials from personal liability for losses in surplus sales they negotiate in good faith.

Increased emphasis on negotiations gives buyers of leftovers a better chance to press for legitimate price reductions. Here are some of the bargaining points that can be used: (1) If the manufacturer is engaged in war production, sales of leftovers that will help the prosecution of the war can be made very expeditiously at reasonable prices. This will continue to be a very strong point as long as the war lasts. (2) In negotiating a price, the manufacturer should emphasize any freight charges which will have to be absorbed to permit use or resale of the leftovers. (3) For the brokers or distributors, commissions, handling charges or profit allowances necessary to affect disposition are all legitimate bargaining points. (4) If the leftover property is not likely to be sold or used quickly, the manufacturer should not hesitate to emphasize the cost of storage and amount of depreciation or deterioration involved if the property is not sold. (5) Similarly, he should be sure to account fully for all his inventory hazards and carrying charges. (6) If he is a distributor or retailer, and plans to offer post-sale services or guarantees when he resells the leftovers, the value of such services should be used as an argument for a price adjustment.

Prices

Determining a fair price for leftovers is a problem that will produce many headaches in the procurement agencies, as well as in SPB and OPA. There are opposing pressures in both government and business. Within the business world, manufacturers of new goods want high prices to kill off competition of leftover products. But business buyers want low prices for profitable use or resale. These opposite attitudes are reflected in the approach of OPA and SPB to the surplus pricing problem. While OPA's primary interest is to set price ceilings to prevent users from overpaying, SPB's chief concern is to set price floors to assure the greatest possible return to the government.

Price floors are more important than wartime shortages for maintaining prices in the long run. The Administration is determined to introduce rigid price floors for leftovers, if necessary to prevent price depreciation or disorder in the market for specific commodities. The Surplus Property Act sets up a definite price floor for surplus farm commodities sold in the U. S. Such commodities may not be sold at prices less than those set up by the Commodity Credit Corp. or current market prices, whichever are higher. This, of course, is classical policy for agriculture. But recently, for the first time, the government put a price floor under a substantial portion of the market for an industrial commodity when it placed dollar-and-cents minimums for government disposal of five kinds of aluminum scrap. If pressure similar to that in the aluminum scrap market develops in other commodity fields where government stocks loom large, the same technic is likely to be used.

In addition to price floors and specific pricing rules, a continuance of the general 75 percent pricing formula now used in setting prices for termination leftovers can be expected. Assumption is that a 25 percent profit margin is not sufficient to attract speculators, but is big enough to encourage legitimate distributors, dealers and war contractors to dispose of leftovers. However, it is a good bet that the 75 percent formula topples by the time hostilities end. One big loophole that exists right now is the permission to sell at less than 75 percent of cost or market price after a "reasonable" time. The term "reasonable" has been left conveniently undefined so that, if necessary, lower prices can be quickly established. While returns from leftover sales will not hit the low of World War I—35 cents on the dollar—they will almost surely be closer to 50 than 75 percent.

Small lots—so-called nominal quantities worth less than $2,500—and leftovers from contract cancel-

(*Turn to page* 184)

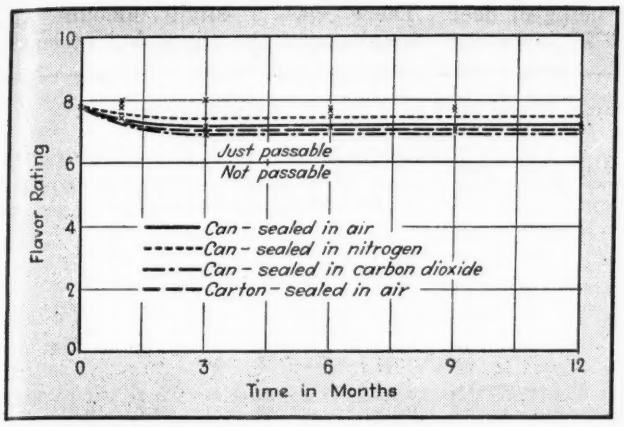


FIG. 1. Effect of storage time and packaging on flavor rating of dehydrated sweet potatoes stored at 75 to 80 deg. F.

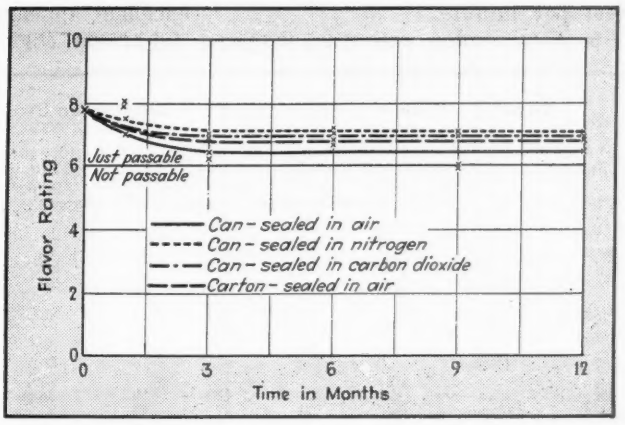


FIG. 2. Effect of storage time and packaging on flavor rating of dehydrated sweet potatoes stored at 98 deg. F.

New Facts About Packaging And Storing Dehydrated Foods

By MEMBERS OF THE RESEARCH STAFF, Research Laboratories, Continental Can Co., Chicago, Ill.

A good source of vitamin A, dehydrated sweet potatoes make an acceptable buttered or candied dish. Regardless of packaging, they hold their flavor and thiamine content for a year and withstand relatively warm storage

PART XIII — DEHYDRATED SWEET POTATOES

DEHYDRATED sweet potatoes make an acceptable food product when reconstituted and served either as buttered or candied sweet potatoes. They are a very good source of carotene (vitamin A), a fair source of thiamine (vitamin B_1) and ascorbic acid (vitamin C), but a poor source of riboflavin (vitamin B_2).

They retain most of their original flavor and thiamine content for one year, regardless of packaging methods used. However, the carotene and ascorbic acid contents decrease to about 60 percent of their original values when the potatoes are stored in air. Storage in an atmosphere essentially free of oxygen is recommended to retain the carotene and ascorbic acid content during the storage period.

They deteriorate quite rapidly when stored at temperatures of 130 deg. F. After three months of storage at this temperature, they were barely edible and not merchantable. After six months at this temperature, they became inedible and had lost over half of their original carotene, thiamine and ascorbic acid contents.

These conclusions are based on the results of examinations through 12 months of storage.

Samples used for this test pack were obtained from the Warriner Starch Co., St. Francisville, La. The potatoes were dried on Oct. 27, 1943, and received at the laboratory on Nov. 2, 1943. The shipping containers were the standard type used by the Army for dehydrated sweet potatoes. They consist of an inner corrugated carton enclosed in a Reynolds foil-lined bag and an outer carton of solid fiber. The Reynolds metal bag, however, was not heat sealed. The top end simply was folded, leaving that end of the bag open to the temperature and humidity conditions encountered while in transit.

These sweet potatoes were of the Porto Rican variety and were grown in Louisiana under very dry soil conditions. The yield was approximately 200 bu. per acre. The dehydrating conditions were:

1. 7-minute blanch at 212 deg. F.
2. Initial drying temperature, 135 deg. F.
3. Final drying temperature, 165

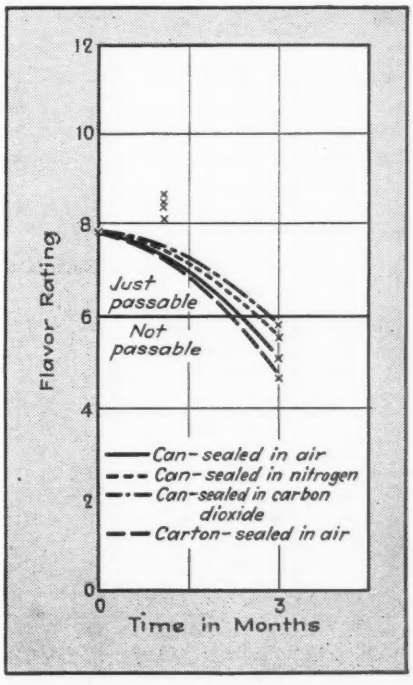


FIG. 3. Effect of storage time and packaging on flavor rating of dehydrated sweet potatoes stored at 130 deg. F.

deg. F. dry bulb; 98 deg. F. wet bulb.

4. Air velocity of 1,320 lineal feet per minute.

5. Tray loaded with 1.26 lb. per square foot of the wet potatoes.

6. Drying time, 10 hours.

The samples, as received, were of excellent appearance, being of deep red-brown color and in large-size slices, some measuring 5 to 6 in. long and 3 in. across. The slices were approximately 1/16 in. thick. There was a slight amount of breakage of the slices, but at least

TABLE I—Results of Examinations of Dehydrated Sweet Potatoes Stored at 75 to 80 Deg. F. (Room Temperature).

Storage time	Package	Flavor rating	Drained weight (grams)	Color (dry product) %N. 1 (black)	%5R4/14 (red)	%5YR6/12 (orange)	%5Y9/14 (yellow)	%N9.5 (white)	Vitamin content (mg./100 gm.) Carotene	Thiamine	Riboflavin	Ascorbic acid Reduced	Total	Gas analyses %O_2	%CO_2	pH
		Moisture content of product — 5.0 percent												Peroxidase activity—negative		
Initial examination	Can—air	7.8	..	43	24	29	4	..	...	....	....	..	..	...	...	..
	Can—N_2	7.8	..	43	24	29	4	..	...	....	....	..	..	0.6	0.4	..
	Can—CO_2	7.8	..	43	24	29	4	..	11.9	0.180	0.213	49	59	1.0	95.6	..
	Carton	7.8	..	43	24	29	4	..	...	....	....	..	..	...	...	..
1 month	Can—air	7.8	27	37	23	36	4	..	9.5	0.206	0.209	32	48	17.0	0.1	..
	Can—N_2	7.4	28	35	27	35	3	..	7.5	0.199	0.206	43	61	1.0	0.6	..
	Can—CO_2	8.0	27	33	30	33	4	..	8.9	0.184	0.202	31	47	1.2	95.5	..
	Carton	8.0	26	45	15	36	4	..	5.8	0.234	0.183	45	58	...	...	..
3 months	Can—air	6.9	33	40	19	38	3	..	10.9	0.218	....	28	41	18.2	1.0	5.1
	Can—N_2	8.0	36	37	27	33	3	..	8.5	0.216	....	32	51	7.7	0.5	5.0
	Can—CO_2	7.1	34	35	29	33	3	..	11.0	0.230	....	35	45	0.8	96.5	5.1
	Carton	7.0	36	43	17	36	4	..	9.0	0.222	....	35	40	...	...	5.1
6 months	Can—air	7.1	33	45	22	30	1	2	6.0	0.215	....	29	38	20.2	1.2	5.5
	Can—N_2	7.4	34	35	22	37	4	2	9.4	0.191	....	..	49	0.2	1.9	5.5
	Can—CO_2	7.7	33	34	24	38	2	2	...	0.193	....	44	53	1.1	96.7	5.6
	Carton	7.7	33	43	17	29	9	2	6.5	0.187	....	38	38	...	...	5.6
9 months	Can—air	7.7	30	43	23	22	8	4	5.9	....	....	25	40	20.0	1.0	5.4
	Can—N_2	7.6	29	28	51	4	15	1	6.7	....	....	29	42	...	...	5.3
	Can—CO_2	7.0	31	37	38	12	11	1	10.0	....	....	41	55	1.5	96.4	5.4
	Carton	7.0	29	59	32	..	9	..	7.8	....	....	11	22	...	...	5.4
12 months	Can—air	7.2	32	37	8	51	..	4	7.5	0.223	0.203	34	46	19.2	1.2	5.6
	Can—N_2	7.4	30	30	18½	50½	..	1	11.2	0.249	0.219	45	51	0.6	1.5	5.6
	Can—CO_2	6.9	31	32	13	53	..	2	12.8	0.204	0.211	44	49	0.9	95.0	5.7
	Carton	7.1	30	52	5	41	..	2	8.9	0.234	0.216	30	36	...	...	5.6

TABLE II—Results of Examinations of Dehydrated Sweet Potatoes Stored at 98 Deg. F.

Storage Time	Package	Flavor rating	Drained weight (grams)	Color (dry product) %N. 1 (black)	%5R4/14 (red)	%5YR6/12 (orange)	%5Y9/14 (yellow)	%N9.5 (white)	Vitamin content (mg./100 gm.) Carotene	Thiamine	Riboflavin	Ascorbic acid Reduced	Total	Gas analyses %O_2	%CO_2	pH
		Moisture content of product—5.0 percent												Peroxidase activity—negative		
Initial examination	Can—air	7.8	..	43	24	29	4	..	...	....	....	..	..	...	...	..
	Can—N_2	7.8	..	43	24	29	4	..	...	....	....	..	..	0.6	0.4	..
	Can—CO_2	7.8	..	43	24	29	4	..	11.9	0.180	0.213	49	59	1.0	95.6	..
	Carton	7.8	..	43	24	29	4	..	...	....	....	..	..	...	...	..
1 month	Can—air	8.1	28	43	20	35	2	..	9.2	0.189	0.192	37	48	19.0	0.0	..
	Can—N_2	7.5	29	40	24	33	3	..	8.1	0.209	0.194	37	59	0.8	0.2	..
	Can—CO_2	7.0	28	46	26	25	3	..	10.8	0.203	0.201	41	65	0.9	94.6	..
	Carton	7.9	27	47	21	29	3	..	9.6	0.198	0.195	23	42	...	...	..
3 months	Can—air	6.4	34	47	23	26	4	..	7.3	0.171	....	25	48	19.5	1.7	5.0
	Can—N_2	7.0	32	37	23	36	4	..	6.8	0.166	....	22	42	0.6	1.1	5.0
	Can—Co_2	6.9	34	43	24	30	3	..	11.0	0.189	....	30	41	0.6	97.9	5.0
	Carton	6.2	33	38	27	31	4	..	8.1	0.181	....	16	27	...	...	5.1
6 months	Can—air	6.8	32	42	22	33	1	2	5.8	0.176	....	27	40	20.3	1.5	5.4
	Can—N_2	6.7	32	39	20	37	2	2	8.8	0.171	....	33	43	0.8	1.6	5.4
	Can—CO_2	7.0	33	39	22	35	2	2	8.0	0.169	....	39	55	1.0	97.0	5.4
	Carton	7.1	32	46	18	31	3	2	4.8	0.161	....	18	35	...	...	5.3
9 months	Can—Air	5.9	28	49	17	27	5	2	6.7	....	....	29	35	19.4	2.2	5.3
	Can—N_2	6.9	31	30	44	13	12	1	9.9	....	....	48	56	4.2	2.2	5.3
	Can—CO_2	7.0	29	38	39	11	11	1	10.3	....	....	40	36	1.4	96.8	5.3
	Carton	6.0	29	62	28	..	10	..	6.9	....	....	26	33	...	...	5.2
12 months	Can—air	6.4	30	35	6	54	..	5	8.1	0.193	0.219	18	26	18.1	2.8	5.4
	Can—N_2	7.0	33	34½	14½	51	..	..	12.1	0.212	0.232	31	41	0.6	3.1	5.5
	Can—CO_2	6.8	30	30½	11½	56	..	2	13.3	0.198	0.260	34	51	1.0	95.2	5.4
	Carton	6.8	31	45	3	49	..	3	7.5	0.161	0.212	11	16	...	...	5.4

TABLE III—Results of Examinations of Dehydrated Sweet Potatoes Stored at 130 Deg. F.

Storage Time	Package	Flavor rating	Drained weight (grams)	Color (dry product) %N. 1 (black)	%5R4/14 (red)	%5YR6/12 (orange)	%5Y9/14 (yellow)	%N9.5 (white)	Vitamin content (mg./100 gm.) Carotene	Thiamine	Riboflavin	Ascorbic acid Reduced	Total	Gas analyses %O_2	%CO_2	pH
		Moisture content of product—5.0 percent												Peroxidase activity—negative		
Initial examination	Can—air	7.8	..	43	24	29	4	..	...	....	....	..	..	...	...	..
	Can—N_2	7.8	..	43	24	29	4	..	...	....	....	..	..	0.6	0.4	..
	Can—CO_2	7.8	..	43	24	29	4	..	11.9	0.180	0.213	49	59	1.0	95.6	..
	Carton	7.8	..	43	24	29	4	..	...	....	....	..	..	...	...	..
1 month	Can-air [2]	8.2	33	51	11	29	9	..	7.0	0.124	0.205	17	23	14.6	2.4	..
	Can—N_2	8.4	31	49	26	21	4	..	10.2	0.130	0.215	23	37	0.8	2.5	..
	Can—CO_2	8.0	30	50	16	29	5	..	9.9	0.122	0.195	31	40	1.0	96.6	..
	Carton	8.3	31	51	11	29	9	..	9.2	0.127	0.198	15	29	...	...	..
3 months	Can—air	5.0	30	62	3	34	1	..	5.8	0.079	....	7	27	9.2	7.7	4.7
	Can—N_2	5.5	29	55	4	40	1	..	8.8	0.088	....	15	31	...	...	4.8
	Can—CO_2	5.8	30	65	6	25	4	..	6.4	0.071	....	19	24	1.2	96.7	4.8
	Carton	4.6	32	60	3	35	2	..	5.1	0.108	....	8	22	...	...	4.8
6 months	Can air	Inedible	30	80	3	14	2	1	5.5	0.043	....	12	28	13.8	13.1	4.8
	Can—N_2	..	30	75	11	10	2	2	7.9	0.053	....	14	29	0.7	12.1	4.7
	Can—CO_2	..	30	68	9	19	2	2	6.9	0.041	....	14	24	0.5	98.0	4.7
	Carton	..	30	79	8	10	2	1	...	0.044	....	14	24	...	...	4.9

95 percent of them remained unbroken. Storage was completed on Nov. 9, 1943.

Flavor tests were made on the reconstituted product prepared according to the following formula: 40 grams of the potatoes is added to 40 c.c. of a 2 percent salt solution and 120 c.c. of water and allowed to soak for 1 hour. The liquid is then brought to a boil and the potatoes are simmered for 45 minutes.

Summary of Results

1. *Effect of Packaging*—No appreciable differences were observed in the flavor or color of the samples packed in the various types of containers. Retention of carotene (vitamin A) and ascorbic acid (vitamin C) contents was better in the gas-packed samples. After 12 months of storage at room temperature, the gas-packed samples retained practically all of their original carotene and ascorbic acid contents, while the air-packed samples retained only about 60 percent. The thiamine (vitamin B_1) content remains practically constant regardless of the method of packaging.

The potatoes packed in the paper containers absorbed only a small amount of moisture when stored at 98 deg. F. and 93 percent relative humidity. For the first 3 months, these packages showed a loss in weight, and only a slight gain after 12 months.

2. *Effect of Storage Time and Temperature*—When stored at 130 deg. F., the dehydrated sweet potatoes retained their initial flavor and color for one month, but began to deteriorate rapidly after that time. After three months of storage at this temperature, the flavor was considerably below passable and much discoloration had taken place. After six months of storage at this temperature, the potatoes were considered inedible and had lost 50 percent of their carotene content, 75 percent of their thiamine, and 65 percent of their ascorbic acid.

At a storage temperature of 98 deg. F., the deterioration in flavor and color is very slight after 12 months. All samples were still considered passable after that time, although there was a slight advantage in favor of the gas-packed samples. The gas-packed samples also retained their carotene and ascorbic acid contents to a greater extent than the air-packed samples. The gas-packed samples retained about 70 percent of their carotene and ascorbic acid contents, and the air-packed samples retained only about 50 percent.

TABLE IV—Results of Periodic Weighings of Dehydrated Sweet Potatoes Packed in Cartons Stored at 98 Deg. F. and 93 Percent Relative Humidity.

Storage time	Number of samples weighed	Average percent increase in product weight over original*
Initial examination	16	..
1 month	16	0.00
3 months	12	0.00
6 months	10	0.11
9 months	8	0.93
12 months	6	2.86

*These figures are corrected for the weight of water absorbed by the paper in the container (4 percent increase in container weight in 5 days).

TABLE V—Results of Periodic Moisture Determinations in Dehydrated Sweet Potatoes.

Storage time	Storage temperature (deg. F.)	Package	Moisture content (percent of total weight)
Initial examination	..	..	..
1 month	98	Carton*	4.64
3 months	98	Carton*	5.20
6 months	98	Can—air	4.90
6 months	98	Can—N_2	5.04
6 months	98	Carton*	5.24
9 months	98	Can—air	3.80
9 months	98	Can—N_2	3.40
9 months	98	Carton*	5.40
9 months	75—80	Can—air	3.60
9 months	75—80	Can—N_2	4.00
9 months	75—80	Carton	3.90
12 months	98	Can—air	4.07
12 months	98	Can—N_2	4.10
12 months	98	Carton*	5.22
12 months	75—80	Can—air	4.04
12 months	75—80	Can—N_2	3.99
12 months	75—80	Carton	4.21

*The paper packages stored at 98 deg. F. were also subjected to a relative humidity of 93 percent.

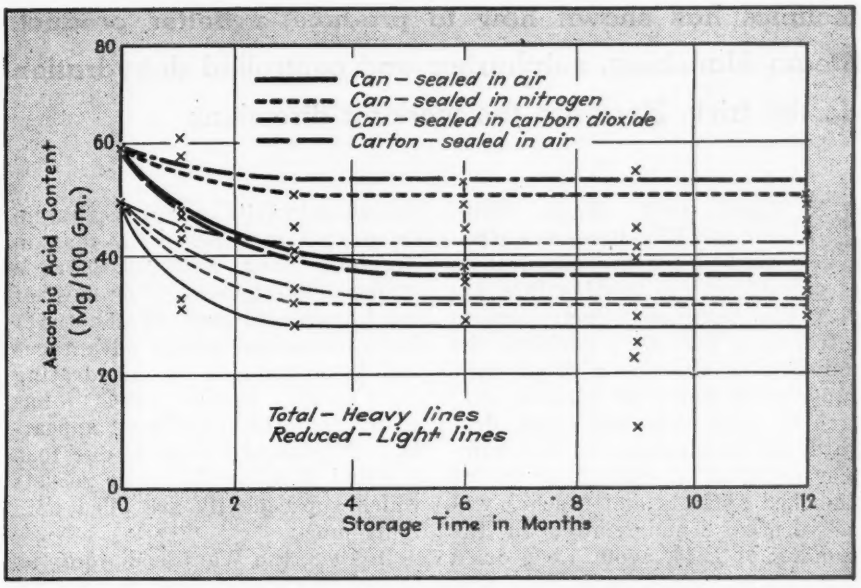


FIG. 4. Effect of storage time and packaging on total and reduced ascorbic acid content of dehydrated sweet potatoes stored at 75 to 80 deg. F.

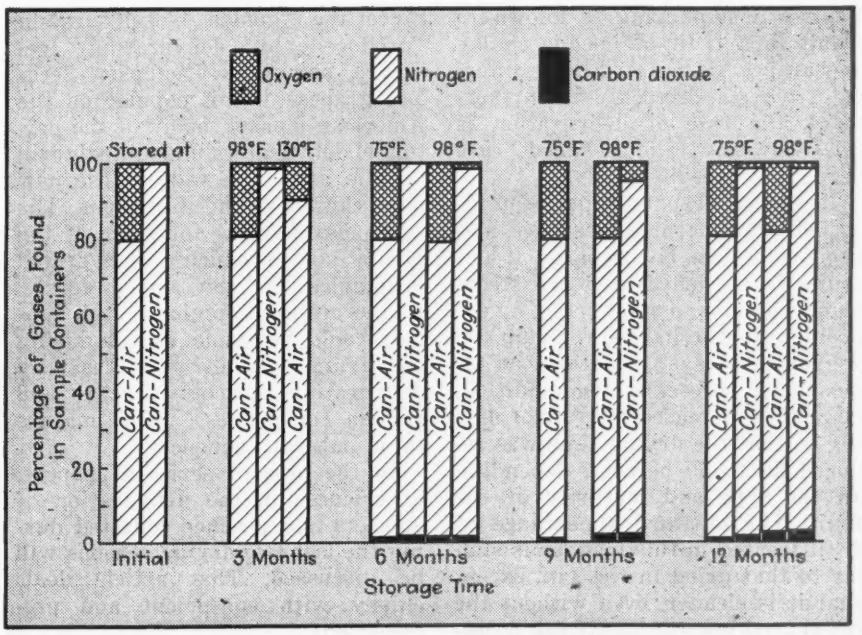


FIG. 5. Effect of storage time and temperature on evolution of CO_2 by dehydrated sweet potatoes packed in air and in nitrogen.

New Methods Produce Superior Dehydrated Cut Fruits*

By H. J. PHAFF, R. L. PERRY† and E. M. MRAK,
University of California at Berkeley and †Davis.

PART I—Large-scale commercial experiment with new technics has shown how to produce a better product. Steam blanching, sulphuring and controlled dehydration do the trick. Here are the working directions

IN April, 1943, Mrak, Phaff, Fisher and Mackinney described a new method for the dehydration of various cut fruits other than apples. The principal objects were to introduce a procedure enabling the industry to produce a dried fruit superior in nutritive qualities and free of dust, dirt and other dry-yard contaminations. In the summer of 1943, a small quantity of blanched apricots and peaches was dehydrated commercially; in the summer of 1944, about 1,500 dried tons of the same fruits was produced, constituting a large-scale commercial experiment.

Simple dehydration in conjunction with sulphuring is known to result in a fruit of opaque chalky appearance, rather strikingly different from sun-dried fruit. Furthermore, the rate of dehydration is relatively slow, and so-called "case hardening" results easily.

It was found that a superior product of translucent appearance and good color can be prepared if cut fruits to be dehydrated are steam blanched prior to sulphuring, by exposing the cut halves (cup up, on dehydrater trays), to steam at atmospheric pressure. In addition, blanching increased the rate of drying so that the drying time was reduced 20 to 50 percent, depending on the type and maturity of the fruit. The outward appearance of fruit treated in this manner is similar to that dried in the sun, except that it is cleaner, even without the usual washing and scrubbing necessary to render sun-dried fruit edible. In addition, the nutritive value (based primarily on better vitamin retention) is superior to that in sun-dried fruit. Sun rays have a strong deleterious effect on most of the known vitamins. Phaff (1944) has summarized all the advantages and disadvantages of dehydrating cut fruits. Crafts (1944) has shown that the translucent appearance of blanched fruit is due to a removal of intercellular air pockets which subsequently are filled with fruit juice.

In 1943, the War Food Administration required the drying of practically all raisin grapes and sponsored the construction of a number of dehydraters for this purpose. Since the "golden bleach" raisin (produced by dehydrating lye-dipped, sulphured Thompson Seedless grapes) is not popular on the American market, many of the new tunnel dehydraters undoubtedly will be idle after the war, unless new uses can be found for them. The same may be true for some of the plants now producing dehydrated vegetables for the armed forces. In the authors' opinions, such tunnels could be made useful during the fruit season by successively dehydrating apricots, peaches and raisins (or prunes) which mature in a natural sequence.

In the present series of papers, experiences in the dehydration of apricots and peaches collected during the last two drying seasons will be discussed. This article deals chiefly with equipment and pretreatment.

The various steps in the process are as follows:

1. Preparation: Washing, cutting and pitting, peeling, size grading and traying.
2. Blanching in live steam.
3. Sulphuring.
4. Dehydration.

These four steps do not necessarily take place in the sequence indicated above, as will be shown under individual fruits. So they will be treated as unit processes, to be applied wherever they are needed. Specific information about individual fruits will be covered in later papers to avoid duplication.

Preparation

Washing—Washing fruit prior to cutting is impracticable, although it would be desirable. The principal objection comes from labor (paid by the box), because the washed fruit slows down cutting. Pears must be washed in dilute hydrochloric acid to remove spray residue.

Cutting and Pitting—This will be discussed under individual fruits.

Peeling—Cling peaches are lye peeled after cutting. This is an old established cannery practice and does not need to be discussed in detail. Emphasis must be laid, however, on an intense washing procedure after lye peeling, in order to reduce browning of the flesh to a minimum. Rotary washers with strong spray nozzles do a good job, while washing by immersion in fresh water is ineffective.

Size Grading Fresh Fruit—Because of the rapid drying rate and the speed with which blanched dried fruit of various moisture levels tends to equalize, size grading for this type of fruit is less important than for straight dehydrated cut fruit, especially if No. 1 or cannery-quality fruit is used. Grading becomes necessary, however, if No. 2 or orchard-run peaches are handled, because of the greater variation in diameter. Size grading is necessary primarily to avoid uneven drying in the dehydrater, which results in scorching small pieces while the larger halves are still too wet. It also facilitates judgment of the finishing of the dehydration by the tunnel operator. Many cars have

*A report on a joint research project of the Quartermaster General's Office, U. S. Army, and the University of California.

Courtesy of Fresno Dehydrating Co.

FIG. 1. Side view of a 60-ft. humpback continuous steam blancher in operation. The trays travel crosswise. In the foreground, trays are being stacked on a car against a traystacker.

been overdried because of waiting for larger pieces. Size grading can be done on the whole fruit by a series of pairs of revolving rollers having matching semicircular circumferential grooves of appropriate sizes.

It also can be done on the cut and peeled halves before traying by passing the fruit over vibrating screens with circular openings of various diameters.

Blanching

Both continuous and cabinet blanchers have been used. The continuous blancher (Fig. 1) permits a more uniform heat penetration, and has a steady demand for steam. The principal advantages of the cabinet blancher are that it occupies only a small floor space and can be built readily of noncritical materials. However, it has a large periodic range in steam demand and also is unsuitable for fruits such as apricots requiring only a short blanch. In addition, careful supervision is required with the cabinet used in batch operation, attention being needed at the start and finish of each batch.

Blanching time varies with the kind of fruit, its size, maturity and variety. It also depends upon the rate of heating in the blancher and the rate of cooling on trays after they are placed on the truck. The latter is influenced by factors like tray length, width of opening between trays, double or single cars, hydraulic loading pits and air drafts. These factors depend on plant conditions and must be learned and taken into account by the operator. In general, the blanch should be adjusted until the flesh of pieces examined immediately after blanching appears to be cooked a little more than two-thirds through. Some additional heat penetration takes place in the stack (stack blanching), because of the slow rate of cooling, and this completes the process. A more complete cook seems to be required for clingstone peaches, and visual observation as to the degree of blanch is very difficult. Final examination should be made of the dehydrated product to determine whether peaches with light-colored opaque areas are coming through the process, for this indicates that the fruit is underblanched.

Control of the blanching process can be understood more readily if the rate of heat penetration into different parts of a cut fruit half are studied by thermocouple temperature measurements. If a peach half, for example, is exposed to steam at atmospheric pressure, the surface temperature rises at once very rapidly (Fig. 2) and then gradually approaches the steam temperature. The center of the piece does not change in temperature at first, but soon begins to rise slowly, and then rapidly, following the surface temperature. Small fruits heat through more quickly, but about 11 minutes is required to heat the centers of large peaches above 200 deg. F. In the above case of a continuous blancher (Fig. 2), the steam temperatures were maintained throughout at a high level. Although steam is distributed rather readily in batch blanchers, the initial steam rate must be extremely high if the fruit is to be heated quickly and uniformly. The effect of inadequate steam rate is illustrated in Fig. 3. A similar condition will occur in continuous blanchers if the steam supply is not enough to keep up the temperature in the first section where the cold fruit enters.

When the trays are removed from the blancher, the surface of the fruit begins to drop in temperature almost at once if heat can escape readily from the stack on the truck. The center of the fruit cools more slowly. Since the center was slower in heating, but its temperature is better maintained on cooling, there is not so much difference in the effect of the process on the surface and center as might be supposed.

If the stack of fruit is confined so that heat cannot escape readily,

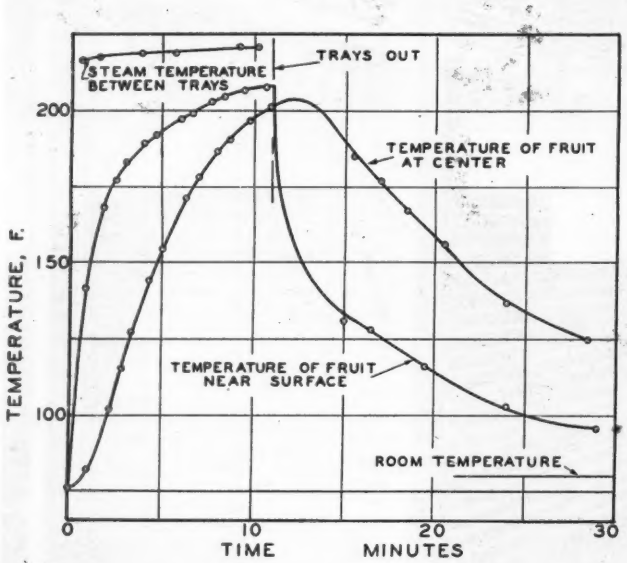


FIG. 2. Temperatures near the surface and in the center of cling peach halves, carried on trays through a continuous blancher.

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Temperatures approaching 212 deg. F. can be attained only where air is not present. The incoming trays tend to carry air into the box. This must be swept out by providing some excess of steam, which will escape at the inlet end. The openings at each end should be provided with baffles, which can be adjusted for the minimum clearance above and below the trays. It usually is desirable to install a hood and vent stack at each end of straight horizontal blanchers.

the fruit cools more slowly. The surface of fruit at the middle of the stack remains at high temperature, and the fruit tends to overblanch. Where long trays closed at the sides are used, artificial cooling is advisable. (See also section on sulphuring.) In its simplest form, the continuous blancher is a long horizontal box, about 15 in. deep and 3 in. wider than the crosswise tray dimension. To avoid excessive length and easier loading, it is desirable to arrange the blancher to take the conventional 3x6-ft. dehydrater tray crosswise, giving a blancher 6 ft. 3 in. wide. With this arrangement, the trays are carried through the box on three conveyor chains, running in shallow steel channels supported on cross members.

In some of the units first built for this purpose, the steam distributing pipes were installed on 6-in. centers, with 1/16-in. holes drilled at 2-in. intervals, these pointing at a slight downward angle and facing each other in two adjacent pipes. Pipes were installed both above and below the conveyor chains. It has been found, however, that steam moves rather freely through the blancher, so that the piping need not be so extensive as was at first thought necessary. Some operators found it possible to shut off the lower distributing pipes, even when trays were double decked.

When the blancher is operating effectively, most of the steam is required in the first section. It is essential to have the distributing piping arranged to provide this, and to install valves on each section which will permit control of the steam, in order to keep up temperature in the first section without waste at the outlet end.

When it was found that some blanchers were forming bottlenecks in plant operations, the expedient of double-decking trays was tried, and examination of the product indicated little difference between top and bottom trays.

One can easily calculate the required length of a continuous blancher if the following factors are known:

1. Maximum blanching time for a given fruit (t, in minutes).

2. Average tray load for a given fruit (L, in pounds).

3. The dimension of a tray measured in the direction of travel through the blancher (W, in feet).

4. Desired capacity in pounds of prepared fruit per hour (C).

Assuming that double-decked trays are used, the necessary blancher length can be computed by substituting the proper values for the letters indicated in the following formula:

$$\text{Blancher length} = \frac{C \times W \times t}{L \times 120}$$

Table I shows maximum blanching time and average tray load for a few fruits.

Example—A plant manager wants to cut 6 tons of apricots per hour. The waste may be assumed to be 10 percent, so the amount of cut fruit per hour is 10,800 lb. (C). $t = 3.5$; $L = 35$; $W = 3$ for a blancher in which 3x6-ft. trays go crosswise. In case of double stacking, the effective required blancher

$$\text{length} = \frac{C \times W \times t}{L \times 120} = \frac{10{,}800 \times 3 \times 3.5}{35 \times 120}$$

$= 27$ ft. In case of single trays the length should be twice as long.

The cabinet blancher consists essentially of a relatively steam-tight box, into which a truck of fruit on trays can be placed. Doors should swing or lift readily, and be fairly tight, particularly at top and sides. Although firm varieties of peaches have been blanched in cabinets holding four stacks of trays (two double trucks) with only a central overhead steam pipe, having fourteen 1/4-in. holes, it seems desirable to provide smaller units with better steam distribution. To accommodate the usual 3x6-ft. trays, arranged for crosswise air flow (short side cleated), uniform steam access can be provided readily by moving the cars into the blancher on a transfer truck. This permits steam pipes on each side of the open tray sides, in fixed positions. When transfer trucks cannot be used and an adequate steam distribution is desired, steam pipes must be installed on the door sides.

Steam Supply

Steam must be provided at a very rapid rate to build up temperatures quickly in cabinet blanchers, especially where fruits which are easily damaged by overblanching are to be processed. In operation of the cabinet blancher, the steam demand drops off materially as the fruit becomes heated. Substantial savings in steam and fuel can be made if some control is installed to reduce steam flow near the end of each batch. This can be done readily by the use of a direct-acting temperature controller. Another method is to install two valves in parallel, one of which feeds the header through a line containing a restricted orifice. Both valves are opened at first, the valve on the unrestricted line being closed when steam loss from the box becomes excessive. A three-way valve would be simpler to operate.

Each cabinet blancher should

TABLE I—Maximum Blanching Time and Average Tray Load.

Fruit	Maximum blanching time in minutes (t)	Average tray load in pounds (L)
Apricots	3.5	35
Clingstone peaches	12	45
Freestone peaches	8	50
Pears	15	55

have a sloping concrete floor with central drain, to remove condensate and fruit juice. Some provision should be made to collect, measure and test the effluent in order to determine if bleeding losses become excessive.

Sulphuring

If sulphuring follows blanching, care must be taken to allow cars containing hot fruit to cool to an approximately lukewarm condition. If not, sulphur dioxide absorption is very poor [see also Long, Mrak, Fisher (1940) and Fisher, Mrak, and Long (1942)], and there is more tendency for breakdown and bleeding of the fruit tissue. When a continuous blancher is used, some cooling takes place while the trays are loaded on the car, but additional cooling is advisable. Cars leaving a cabinet blancher are hot throughout. Cooling may be effected by placing the cars in a draft or by putting them in a tunnel dehydrator, with or without heat. (The latter is more efficient, particularly when a cabinet blancher is used.) The evaporative cooling is so strong in the dehydrater that the use of heat may be recommended to dry the outer surface somewhat, which helps to prevent bleeding in the sulphur house and tends to increase the SO_2 absorption.

At present, the only practical way to introduce sulphur dioxide into the fruit is by exposing the halves to the fumes of burning sulphur. The use of sulphite solutions is impractical because of poor penetration and leaching of sugar. The use of liquid compressed sulphur dioxide in cylinders requires the presence of a fan in each sulphur house, because SO_2 is a gas of high density and tends to collect at the bottom of the house. It also requires exceptionally tight sulphur houses, more supervision and is more expensive.

Two Factors

When fruit is to be shipped to hot climates, a high SO_2 content is essential to improve its keeping quality. Also, fruit remaining in temperate zones will have a better storage life if the sulphur content is higher than that in fruit taken from the dry-yard.

Without the extra handling of dry-yard resulphuring, a high sulphur dioxide content can be obtained only through dehydration. In general, two factors govern the final SO_2 content of a product: (1) the original SO_2 absorption by the fresh fruit (determined by the condition of the sulphur house, temperature and type of fruit) and (2) the sulphur dioxide retention during the drying process (favored by rapid drying and low humidity in the atmosphere around the fruit). The ratio of the sulphur content of the dried product divided by that of the fruit right after sulphuring is called the "retention ratio" (see Long *et al*, 1940). Both values should be determined periodically by the plant chemist. The parts per million of SO_2 in the wet product indicate whether the sulphuring is done properly, while the SO_2 retention ratio is an indication of whether the dehydration is done efficiently under proper humidity conditions. Details of sulphuring technic are described by Long, Mrak and Fisher, while SO_2 behavior during dehydration is mentioned briefly under dehydration and further under specific fruits.

Dehydration

The two fundamental changes in the fruit during the process of drying are evaporation of water and sulphur dioxide. The ideal is to make the conditions such that removal of moisture from the fruit tissue takes place as quickly as possible, and loss of SO_2 as slowly as possible. A number of factors controllable by the operator help to reach this goal. It should always be kept in mind that the shorter the drying time of a given fruit, the better the SO_2 retention. The principal factors contributing to a short drying time are a high air flow (700 to 1,000 linear ft. per minute) and a moderate humidity on the cool (or wet) end of a tunnel dehydrater. It is recommended that the difference between the dry- and wet-bulb temperatures at the cool end should at no time be smaller than 15 deg. F. This corresponds to about 50 to 55 percent humidity. A similar value was recommended by Van Arsdel for vegetables. This implies that a wet-dry bulb set of thermometers should be installed at the cool end of the tunnel. *We consider this control instrument equal in importance to that on the finishing end.* If the tunnel humidity becomes too high (mostly due to overloading or too rapid loading) large losses of sulphur dioxide take place. This is because moist air is constantly blowing over the product, and although the air is nearly saturated with moisture it readily can absorb large amounts of SO_2.

To improve SO_2 retention it is also essential that cars of sulphured fruit do not stand outside the sulphuring house for any length of time, because the freshly sulphured fruit loses SO_2 rapidly while standing in air, particularly in a draft. If enough sulphur houses are available, cars should remain inside with the doors closed until ready to go into the dehydrater.

Another important factor is to stagger cars over various tunnels with sufficient spacing of time. This is necessary because blanched fruit

(Turn to page 178)

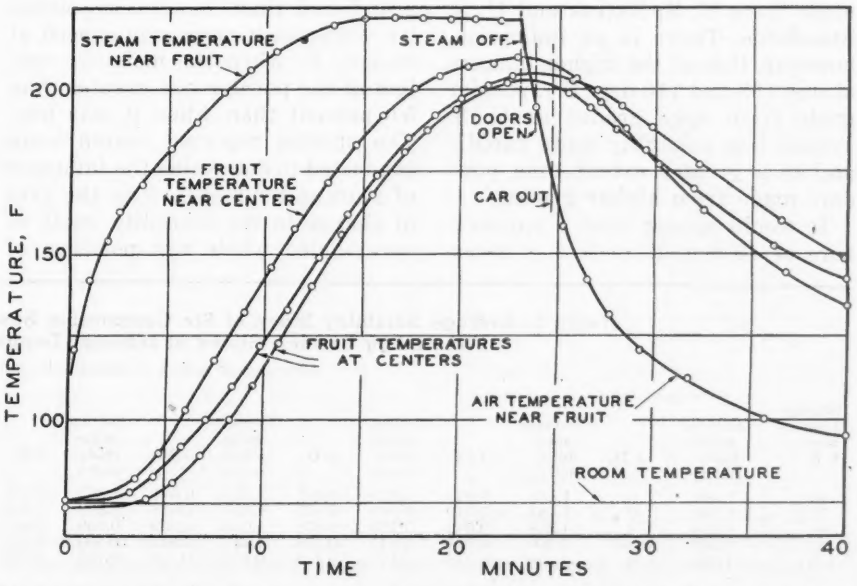


FIG. 3. Temperatures of cling peach halves in the middle of the middle tray in one stack on a double car in a cabinet blancher. Heating of fruit was retarded by the slow rise of the cabinet temperature, even though the steam rate was equal to 100 b.h.p. for 4,400 lb. of fruit.

Quality of Egg Powder Affects Rate of Change in Solubility

By L. S. STUART,* HARRY E. GORESLINE,* HELEN F. SMART* AND VIRGINIA T. DAWSON,†
Eastern Regional Research Laboratory,‡ Philadelphia, Pa.

Spray-dried whole egg powder of low sanitary quality decreases in solubility to a greater extent and at a faster rate than that of high quality. Prompt cooling and refrigerated storage are essential in any case

THE solubility of spray-dried whole egg powder decreases during storage at all temperatures from 0 to 110 deg. F., and the rate of change increases as the temperature increases. With powder of high sanitary quality, as indicated by bacterial count, there appears to be a tendency for solubility to diminish to a constant level, depending on the temperature of storage.

During storage at all temperatures, whole egg powder of low sanitary quality decreases in solubility to a greater extent and at a much more rapid rate than powder of high sanitary quality. No differences are noted in the rate of loss of solubility in spray-dried powders made from carefully broken-out lots of U. S. Standard and U. S. Extra shell grades, and surprisingly little difference is observed in the loss of solubility of powder made from U. S. Trades, as compared with powders made from U. S. Extras and U. S. Standards. There is an indication, however, that at the higher temperatures (98 and 110 deg. F.), powder made from eggs graded as U. S. Trades lose solubility more rapidly and to a greater extent than powders made from higher grades.

It would appear that a temperature of 45 deg. F. or less is necessary to prevent marked decreases in solubility in powder of high sanitary quality. In powders of low sanitary quality, marked decreases in solubility may occur, even at 0 deg. F.

At high temperatures, decreases in solubility take place rapidly in all grades and classes of powder studied. Prompt cooling and refrigeration storage seem to be essential for the maintenance of quality in spray-dried whole egg powder.

Research Study

Stuart, Grewe and Dicks in 1942[1] outlined two methods for determining the relative water solubilities of spray-dried whole egg powders. Using these methods, Stuart, Hall and Dicks (1942)[2] found that marked decreases in the solubility of egg powder occurred independently of changes in the free fatty acid content or the formol nitrogen and total free carboxyl group values. It was also found that changes in solubility were much more pronounced at 86 deg. F. when the moisture content of the powder was greater than 5.0 percent than when it was less. The studies reported herein were conducted to determine the influence of storage temperature on the rate of change in the solubility index of spray-dried whole egg powders of different sanitary quality or different initial solubility, or made from shell eggs of different candle grades.

All samples were stored in screw-capped glass bottles, and each bottle was sealed with paraffin, after closure, to prevent changes in moisture concentrations during the storage period. The storage temperatures ranged from 0 to 110 deg. F. Solubility was determined at the time the samples were stored and at periodic intervals during storage. The solubility-index method used was based on heat coagulation of the filtrate from a suspension of dried whole egg in the presence of an acetate buffer at pH 4.6 and determination of the volume of the coagulum after centrifuging.[1]

In the first study, six samples of spray-dried whole egg powder made from egg meats from the same breaking line, and dried in successive runs in the same drying chamber, were stored for 10 weeks at 45, 75, 86, 98 and 110 deg. F. These samples were all of the same relative sanitary quality. They had initial direct microscopic counts[3] of less than 1 million bacteria per gram and initial dilution plate counts[3] of less than 300,000 cells per gram. The initial solubility index of all six samples was the same—namely, 1.5—and the moisture content was 4.43 ± 0.11 percent.

* Transferred to Office of Distribution, War Food Administration.

† Transferred to Bureau of Plant Industry, Soils and Agricultural Engineering, Agricultural Research Administration.

‡ One of the laboratories of the Bureau of Agricultural and Industrial Chemistry, Agricultural Research Administration, U. S. Department of Agriculture.

Table I—Average Solubility Index of Six Comparable Samples of Spray-dried Whole Egg Powders Stored at Different Temperatures.

After storage period, in weeks indicated

Storage temperature, ° F.	0		1		2		3		4		6		8		10	
	Average solubility index	A.D.[1]	Average solubility index	A.D.	Average solubility index	A.D.	Average solubility index	A.D.	Average solubility index	A.D.	Average solubility index	A.D.	Average solubility index	A.D.	Average solubility index	A.D.
45	1.500	0	1.450	0.033	1.425	0.081	1.392	0.041	1.383	0.078	1.375	0.108	1.367	0.091	1.365	0.079
75	1.500	0	1.433	0.041	1.409	0.045	1.333	0.048	1.308	0.065	1.217	0.056	1.108	0.078	1.083	0.110
86	1.500	0	1.308	0.046	1.283	0.078	1.058	0.059	0.866	0.057	0.858	0.061	0.833	0.066	0.820	0.080
98	1.500	0	1.300	0.071	1.217	0.139	1.049	0.071	0.859	0.131	0.833	0.144	0.825	0.142	0.775	0.122
110	1.500	0	1.058	0.158	0.975	0.1 0	0.825	0.121	0.792	0.125	0.675	0.100	0.608	0.103	0.592	0.101

[1] A. D. = Average deviation.

Table II—Average Solubility Index Values of Stored Spray-dried Whole Egg Powders of High and Low Sanitary Quality.

Storage temperature, °F.	Sanitary quality	Average solubility index after storage periods, in weeks, indicated								
		0	1	2	3	4	6	8	10	12
0	High	1.50	1.45	1.40	1.40	1.40	1.40	1.40	1.40	1.40
	Low	1.50	1.25	1.15	1.05	1.00	1.00	1.00	1.00	1.00
45	High	1.50	1.40	1.38	1.37	1.37	1.37	1.37	1.37	1.37
	Low	1.50	0.98	0.93	0.90	0.90	0.90	0.90	0.90	0.90
75	High	1.50	1.30	1.28	1.15	1.05	1.00	0.98	0.95	0.92
	Low	1.50	0.93	0.93	0.90	0.88	0.78	0.75	0.73	0.70
86	High	1.50	1.20	1.15	1.05	0.95	0.90	0.88	0.83	0.80
	Low	1.50	0.90	0.80	0.80	0.70	0.65	0.65	0.65	0.60
98	High	1.50	1.15	0.95	0.83	0.80	0.78	0.75	0.68	0.60
	Low	1.50	0.65	0.58	0.55	0.50	0.48	0.48	0.48	0.40
110	High	1.50	0.95	0.85	0.78	0.67	0.60	0.58	0.55	0.50
	Low	1.50	0.63	0.40	0.40	0.40	0.40	0.40	0.40	0.40

The samples were scored as follows: 9 and 10 for the best fresh-shell-egg flavor; 6, 7 and 8 for flavors suitable for egg dishes; 4 and 5 for flavors not good enough for egg dishes but acceptable for bakery products; and 0, 1, 2 and 3 for definitely inedible eggs—that is, objectionable or repulsive in taste. On this basis, all six samples when stored had a "palatability score" of 7.0.

Results of the solubility index determinations after various periods in storage are given in Table I. The small values for the average deviations in this table show that, within the range of accuracy of the method, the results with all six samples were the same. Thus, it would appear that the values portray a true picture of the influence of storage temperature on the change in solubility. Figure 1 shows the rate of shange at each temperature. The initial solubility index value was zero. From this figure it is apparent that the velocity of change increased as the storage temperature increased. It is also clear that the rate of change at all temperatures decreased with length of the storage period.

To determine the difference in the behavior of powders of high- and low-sanitary quality during storage, solubility index measurements were made on two samples of each quality after storage for different periods of time at 0, 45, 75, 86, 98 and 110 deg. F. As in the previous studies, all samples were stored in sealed screw-capped bottles. The initial solubility index of all four samples was 1.5, and the moisture content was 4.83 ± 0.16 percent. The average palatability score was 7.0. The direct microscopic counts on the two samples of low sanitary quality were 135,000,000 and 262,000,000 cells per gram, and on the two samples of high sanitary quality they were 356,000 and 560,000 per gram. The results of this study are given in Table II.

Effect of Quality

From the results in Table II it is apparent that initial changes in the solubility index of powder of low sanitary quality were much greater at all temperatures than in that of powder of high sanitary quality. The comparative rates of change of these two types of powders at 0, 45, 86 and 110 deg. F. during 12 weeks of storage are illustrated in Fig. 2. This figure shows that the greatest difference in the loss of solubility in the two classes of powder occurred at the lowest storage temperatures; namely, 0 and 45 deg. F. This indicates that low storage temperatures are not nearly so effective in preventing deterioration in powder of low sanitary quality as in powder of high sanitary quality. From the viewpoint of plant procedures, it seems important to emphasize this point before passing on to results obtained in succeeding studies. These results seem to establish the fact that if candling and breaking procedures are sloppy, or if unsanitary practices are followed in dehydrating eggs, cold storage of the resulting powder may fail to maintain solubility to the same degree that it does with spray-dried powder produced from shell eggs carefully candled, and broken out and dried under rigid sanitary conditions.

The solubility index used in these studies reflects, among other things, the extent of heat denaturation of the egg protein that has occurred during drying. It was observed early in our studies on solubility that, other factors being equal, changes in spray-dried powders having slightly reduced initial solubility index values were less pronounced than in powders having the highest solubility. Table III gives index measurements of powders of comparable sanitary quality and moisture content but with different initial solubilities after storage at 45, 75, 86 and 98 deg. F. for different periods of time. The values for powder having an initial solubility index of 1.5 are taken from Table I. The samples with initial solubility index values of 1.3, 1.1 and 0.9 had moisture contents of 4.54

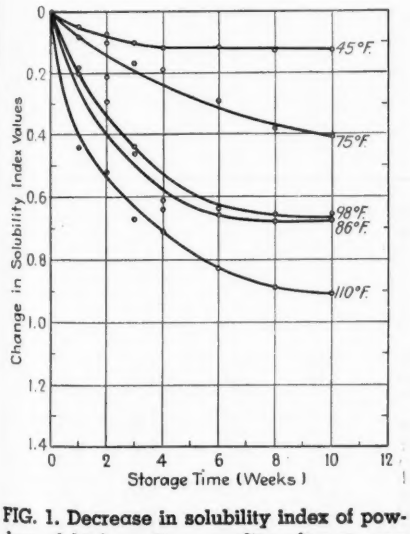


FIG. 1. Decrease in solubility index of powders of high sanitary quality after storage at various temperatures for periods up to 10 weeks.

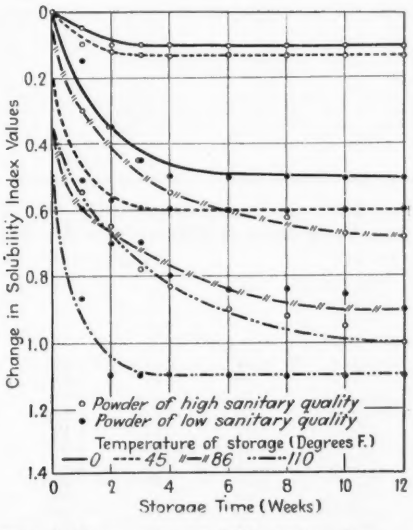

Change in Solubility Index Values
Storage Time (Weeks)
° Powder of high sanitary quality
• Powder of low sanitary quality
Temperature of storage (Degrees F.)
0 45 86 110

FIG. 2. Change in solubility index of powders of high and low sanitary quality after storage at various temperatures.

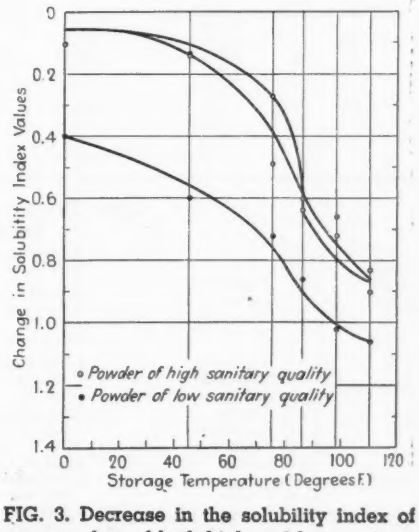

Change in Solubility Index Values
Storage Temperature (Degrees F.)
° Powder of high sanitary quality
• Powder of low sanitary quality

FIG. 3. Decrease in the solubility index of egg powders of both high and low sanitary quality after 6 weeks' storage at various temperatures.

± 0.31 percent, direct microscopic counts of less than 1 million bacteria per gram, and total viable cell counts (dilution plate) of less than 150,000 bacteria per gram, as received directly from the drying operation.

Table III shows that at all temperatures the rate of change in the solubility index was less in the samples having initial index values of 0.9, 1.1 and 1.3 than in the samples having initial index values of 1.5. The exact significance of this observation is not known, but it would seem to indicate that slight denaturation during the drying operation may be accompanied by some stabilization of the egg proteins. It is obvious, however, from the results given that the two samples with the highest initial solubility index values were superior in solubility to the two samples with lower initial solubility values after 10 weeks' storage at 45 and 75 deg. F. and approximately as good at 86 and 98 deg. F. This indicates that the production of powders of high initial solubility is desirable and that denaturation during drying, in spite of a possible slight stabilizing effect, offers no material advantage.

To determine the effect of the candle grade of edible shell eggs used, commercial batches of U. S. Extras, U. S. Standards and U. S. Trades were carefully broken out and dried in successive operations of the same Douthitt dryer. The breaking was carefully supervised to eliminate shell eggs having high bacterial counts. An ultraviolet lamp was employed to detect badly infected eggs, since previous studies[4] had shown that about 86 percent of all shell eggs having plate counts above 1 million bacteria per gram can be detected through fluorescence when examined under an ultraviolet lamp.

Direct microscopic and dilution plate counts of the three lots of finished spray-dried powder showed them to be of comparable sanitary quality. Thus, we can assume that the principal differences between these lots were in other qualities of the shell eggs from which they were made—that is, in moisture loss from the eggs (as shown by larger air cells in the lower grades), in the thickness of the whites and in fragility of the yolk membranes brought about by physical and biochemical factors.

As in the previous study, samples of all three lots of finished powder were stored in sealed screw-capped glass jars at temperatures of 45, 75, 86, 98 and 110 deg. F. for 10 weeks. Solubility index measurements were made just before they were put in storage and after various periods. The results are shown in Table IV.

From these results, it is apparent that there was little or no difference in the behavior during storage of powder made from U. S. Extra and U. S. Standard grade eggs. There was surprisingly little difference between results obtained with powder made from U. S. Trades and those with powder made from U. S. Standards and U. S. Extras, but there was a strong indication that solubility of powder made from the U. S. Trades was more susceptible to change during storage at high temperatures than was that of the other two. At 110 deg. F. the solubility index of this powder dropped to 0.85 in one week, as compared with a drop to 1.10 and 1.25 in the indices of the powders made from U. S. Extras and U. S. Standards. At 98 deg. marked differences were noticeable after 4 weeks' storage. At the lower temperatures, no appreciable differences were noted.

In Fig. 3, decreases in the solubility index of powders of high and low sanitary quality after 6 weeks of storage (shown in Tables I and II) are plotted against storage temperatures to ascertain the critical temperature for maintenance of solubility. Two possible curves are indicated for powder of high sanitary quality, both of which indicate that accelerated changes occurred above

(*Turn to page* 186)

Table III—Solubility Index of Stored Spray-dried Whole Egg Powders of Different Initial Solubilities.

Storage temperature, ° F.	Initial solubility index	Solubility index after storage period, in weeks, indicated							
		1	2	3	4	6	8	10	12
45	1.500	1.450	1.425	1.392	1.383	1.375	1.367	1.365	....
	1.300[1]	1.300	1.250	1.250	1.250	1.250	1.250	1.200	1.200
	1.100[1]	1.100	1.100	1.100	1.100	1.100	1.100	1.100	1.100
	0.900[1]	0.900	0.900	0.900	0.900	0.900	0.900	0.900	0.900
75	1.500	1.433	1.409	1.333	1.308	1.217	1.108	1.083	....
	1.300	1.250	1.250	1.200	1.150	1.150	1.150	1.100	1.100
	1.100	1.100	1.100	1.100	1.100	1.000	1.000	1.000	1.000
	0.900	0.900	0.900	0.900	0.900	0.900	0.850	0.850	0.850
86	1.500	1.308	1.283	1.058	0.866	0.858	0.833	0.820	....
	1.300	1.250	1.200	1.150	1.100	1.000	0.950	0.900	0.850
	1.100	1.000	1.000	1.000	0.950	0.900	0.900	0.900	0.850
	0.900	0.900	0.900	0.850	0.850	0.800	0.800	0.800	0.800
98	1.500	1.300	1.217	1.049	0.859	0.833	0.825	0.775	....
	1.300	1.250	1.200	1.100	0.950	0.900	0.900	0.850	0.800
	1.100	1.000	0.950	0.950	0.900	0.900	0.850	0.800	0.800
	0.900	0.800	0.800	0.800	0.700	0.700	0.650	0.650	0.600

[1]Average of 2 samples.

Table IV—Solubility Index of Stored Spray-dried Whole Egg Powders Made from Shell Eggs of Different Candle Grades.

Storage temperature, °F.	Candle grade	Initial bacterial count		Solubility index after storage period, in weeks, indicated							
		Direct microscopic	Viable cell (dilution plate)	0	1	2	3	4	6	8	10
		per gram	per gram								
45	U. S. Extras	1,000,000	110,000	1.50	1.45	1.45	1.50	1.50	1.40	1.40	1.40
	U. S. Standards	700,000	67,000	1.50	1.45	1.45	1.40	1.40	1.40	1.40	1.40
	U. S. Trades	900,000	145,000	1.50	1.35	1.30	1.30	1.25	1.20	1.20	1.20
75	U. S. Extras	1,000,000	110,000	1.50	1.40	1.40	1.40	1.40	1.20	1.15	1.10
	U. S. Standards	700,000	67,000	1.50	1.45	1.40	1.40	1.40	1.30	1.20	1.10
	U. S. Trades	900,000	145,000	1.50	1.35	1.30	1.30	1.25	1.25	1.20	1.20
86	U. S. Extras	1,000,000	110,000	1.50	1.35	1.30	1.00	0.90	0.85	0.80	0.80
	U. S. Standards	700,000	67,000	1.50	1.25	1.20	1.10	1.00	1.00	0.95	0.90
	U. S. Trades	900,000	145,000	1.50	1.35	1.30	1.10	0.85	0.85	0.80	0.80
98	U. S. Extras	1,000,000	110,000	1.50	1.40	1.40	1.20	1.15	1.00	0.80	0.70
	U. S. Standards	700,000	67,000	1.50	1.30	1.20	1.05	1.00	1.00	1.00	0.90
	U. S. Trades	900,000	145,000	1.50	1.30	1.20	1.05	0.80	0.75	0.75	0.70
110	U. S. Extras	1,000,000	110,000	1.50	1.10	0.95	0.90	0.90	0.80	0.80	0.80
	U. S. Standards	700,000	67,000	1.50	1.25	1.15	1.00	0.80	0.80	0.80	0.75
	U. S. Trades	900,000	145,000	1.50	0.85	0.80	0.80	0.80	0.80	0.75	0.70

EDITORIALS

LAURENCE V. BURTON, Editor

Politics and Rationing

OF six possible explanations of the suddenness of OPA action in reinstating rationing of food as America's New Year's greeting to all people, the strictly political explanation did not at first occur to many.

As a working hypothesis the following ideas were proposed and later abandoned:

1. Loss of food supplies in Europe as a result of the German offensive. There is no connection between it and the latest rationing episode, according to all sources of information. But the German breakthrough gave a perfect excuse for action.

2. Losses of food enroute overseas. For years this factor has been allowed for in the entire set-aside program, and did not motivate OPA.

3. Possible huge losses in government-owned stockpiles or dumps overseas. But there have been no recent *emergency* shipments of food overseas. All is still routine.

4. Drought in Australia which might force us to supply more from the mainland of the United States. No evidence yet that this is a significant factor.

5. Need to feed liberated Filipinos. It is known that the Japs had taken away much of their food, but there is no evidence yet that this is a current factor.

6. Possibility of a big drought in 1945. Set-asides in 1943 were based on a possible drought in 1944, which may explain why WFA has been selling food in considerable quantities in late 1944. Furthermore, a possible drought in 1945 is too problematical a basis for such drastic action as canceling huge quantities of ration stamps that people had been assured were to be good indefinitely.

Not one of the foregoing possibilities will stand up under close scrutiny after a searching inquiry. There remains, apparently, nothing but the strictly political explanation. Informed sources are convinced that rationing should not have been curtailed in the first place, or that it should have been reextended long ago, but it was politically inexpedient to do so before November 7, 1944. After that date, the adverse turn of events supplied the opportunity to do what was political dynamite before the German breakthrough. Also, many officials in Washington felt that this was an excellent way to bring home the realities of war.

The plain facts are that the food situation has been the cause of much worry to far-sighted people in the know. As causes, they cite: (1) Uneconomic subsidies and rollbacks. (2) Inequities of OPA ceiling prices. (3) High consumer purchasing power resulting in unprecedented demand for types of food in unequal supply. (4) Declining production of pork and butter. (5) Declining numbers of cows on farms.

American muddling is reaching a record high.

Dehydrated Vegetables To Get Civilian Test

A REAL market test, as contrasted to the Chicago consumer survey, is scheduled for five dehydrated vegetables for the next half-year in Grand Rapids, Mich. Beets, carrots, onions, sweet potatoes and white potatoes are to be tried.

Except for a handful of old-timers in this field, all are newcomers who have been selling only a single customer, the government. It is to be hoped that this test is supported by adequate sales promotion and followups to see what consumer reactions developed. The famous Springfield, Mass., tests conducted by Birds Eye Frosted Foods in the early Thirties should be the prototype of the Grand Rapids test.

It is to be hoped that the housewife follows directions better than army cooks. It is also to be hoped that, if the public does not respond with alacrity, the producers will realize they are trying to introduce foods that are seldom purchased under any form of preservation. The projected test is not the equivalent of selling dehydrated sweet corn, lima beans or peas which are familiar to everyone in either canned or frozen form. Nevertheless, the effort is commendable and the results of the test will be very useful. It is of importance the postwar future of vegetable dehydration.

Price Ceiling Affects Public Health

OPA PRICE ceilings on certain types of cheese made from unpasteurized milk have become an unsuspected public health menace of an indirect nature. Only after outbreaks of typhoid fever have been traced to cheese has it come to light.

American practice has not yet gone over to pasteurization of all milk used in cheese making. Only a few manufacturers have adopted this practice, which is general in New Zealand. Prior to the war, the cheese was in cure for a period long enough to permit the death of all pathogenic bacteria during the obscure biochemical processes of aging. While the purpose of the cure is to improve the edibility of the cheese, it is undeniable that a secondary effect is the destruction of some forms of bacterial life. And many of the disease-producing bacteria are most susceptible to destruction when outside their favorite habitat, the body. Where processed cheese is made from the original cheese, the heat treatment will safeguard the product. But when the cheese is consumed raw, and aging time in storage is unusually curtailed, any pathogens that are accidentally present may escape destruction. Under price controls that have recently been in effect, the economic incentive has been in the direction of very short cures to minimize moisture losses —so short, in fact, that the customary destruction of bacteria by aging cannot become effective.

Although this hazard has not become of serious magnitude, it

serves to focus attention on certain phases of food technology that are little known. It also shows that pasteurization of all milk for cheese making is an important improvement to be expected as soon as the equipment is made available.

The Mystery Of the Double Wrap

LIKE to start an argument? If so, you might spring this one on your associates:

Is double protection given to a packaged product by double wrapping?

In mathematical terms, is wrapping an additive function, or is it a factorial function?

This is the big unknown in packaging today. Some say that double wrapping doubles whatever protection the single wrapper contributes, such as resistance to moisture-vapor passage.

But others say that if a single wrapping will permit a given quantity (x) to pass through, a double wrap will permit just as much to enter or leave the package. The argument goes that if a person can walk through one door, he can walk just as easily through two doors in succession.

Who is the genius who can settle the argument without recourse to actual laboratory tests?

Failure To Follow Instructions

IT is not often that one can learn the full history of a food law violation. Hence we share this episode with you, for it shows that more than mere desire is required for compliance with the law. It takes teamwork, especially in a large organization.

The Food & Drug Administration had seized a block of canned corn in the hands of a large distributing organization. The corn was libeled as substandard, yet it carried the top- or fancy-quality label of the distributor. And under the law, any food which is substandard must carry a label declaration to that effect. Knowing that quality control is almost a fetish in that organization, we inquired "How Come?", and here is the explanation:

A branch distributing warehouse had neglected to send samples to the laboratory for final grading at the time the goods were received. Later, a Federal inspector called on a routine visit and took away samples of nearly everything. This time, however, the branch manager remembered to send duplicate samples to the central grading laboratory. For the first time the lab learned that the firm's top-quality label was on substandard canned corn. Orders were issued to have the fancy label removed at once.

Unhappily, compliance was tardy, and a few days later a Federal marshal appeared and seized the corn, all of which still bore the fancy label. What happened to the manager is immaterial to this tale.

The lesson to be drawn is that teamwork failed. The company had no intention of violating the law. In spite of a setup to avoid such violation, a failure of manpower undid the plan, and a proud label fell into disreputable company.

More Than Food Technology Needed

FIELD OBSERVATIONS in the frozen fruit and vegetable industry show very clearly that quality control must begin long before the man in the plant receives the raw material. Quality control in the plant requires good-quality materials to start with. For it is impossible to bring up quality to the desired level, if some one outside has failed in this respect.

The trend in the frozen food field seems to be towards the employment of quality-control men who combine food technology and agronomy or horticulture. Or else management engages the services of two specialists.

Even all the foregoing virtues are not enough to make for good quality control unless the management has plenty of backbone. Top men must insist on the right quality, and back up their subordinates when it comes to a contest of wills betwen supplier and buyer. And management must never let down the bars, or compromise with the concept of the right quality, or all efforts will be wasted.

Food technology points the way, but it takes more than food technology to achieve desired results.

Why Small Batches?

EVERY now and then someone stoutly maintains that large batches are impossible, that only by a multitude of small batches can one attain high-quality production. Some plants will have a multiplicity of batches of not over 4 or 5 gal. Multiplicity? Yes, thousands of such batches. Others will have an operation based on several dozen 50 or 75-gal. batches, when to a casual visitor it would appear that a tenth of that number would be a great economy and should produce the same degree of quality.

There was once a time when preserved fruits had to be made in small batches, largely because they had always been made that way. Today, preserves can be made—even better than before—in large batches in vacuum pans. But not every manufacturer has gone to the more efficient way.

There was a time when jelly could not be made in batches of larger than 100 gal., but some manufacturers now use continuous processes that operate at an astonishing rate.

And not so many years ago, pickles were put into sour or sweet cure in tens of thousands of 16-gal. kegs. Now the job is done in large tanks with less cost and better control.

What are the arguments for small batches today?

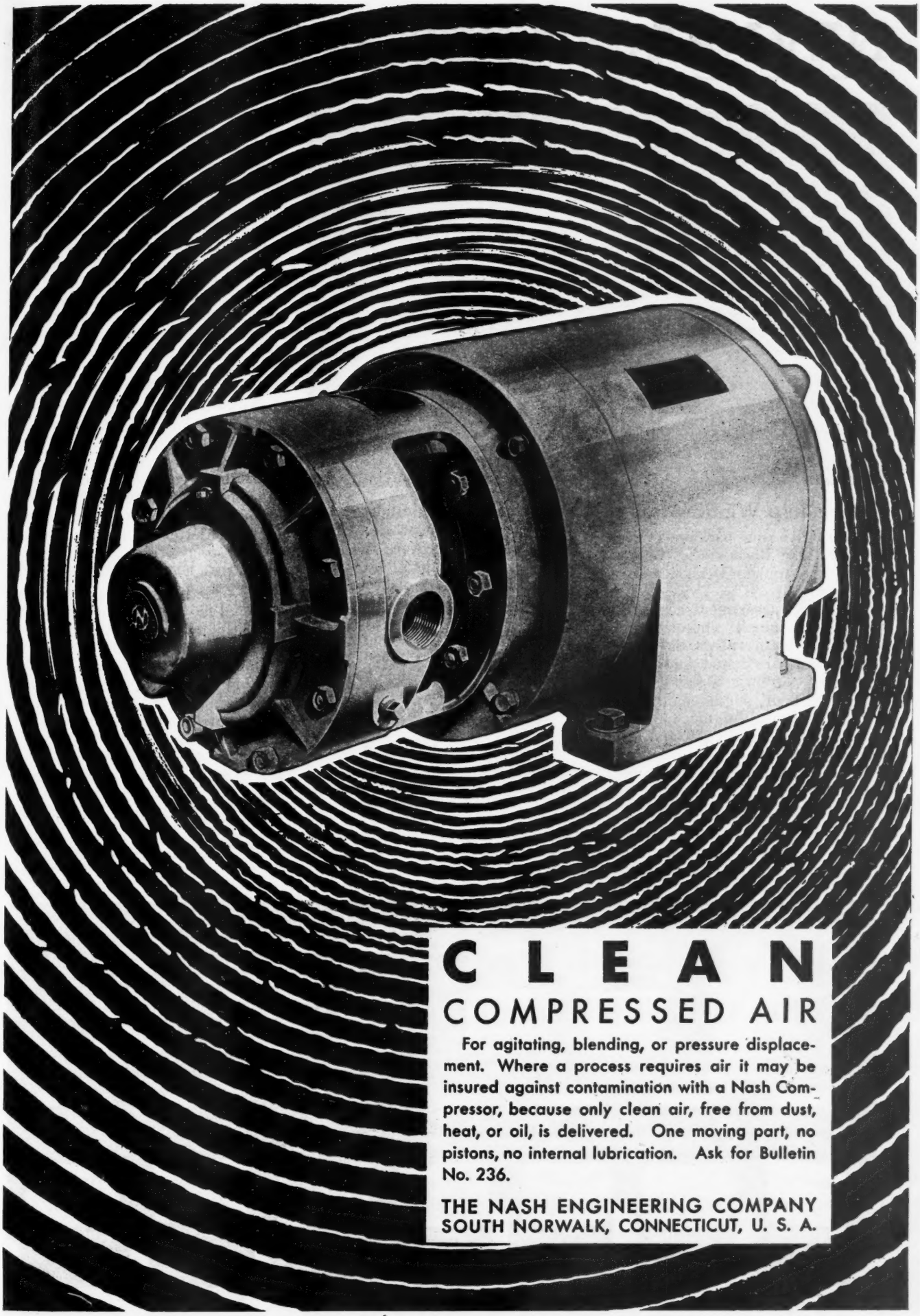
Decline in Butter

Do you like the butterless meals served in most restaurants and hotels?

Neither do we.

But is this absence of any sort of fat spread likely to accustom our people to eating their bread or rolls dry? Will we emerge from wartime restrictions with a reduced appetite for butter? Will our 17-lb. per capita prewar consumption acquire a permanent deflection, say to 12 or 14 lb.?

Your guess would be interesting reading.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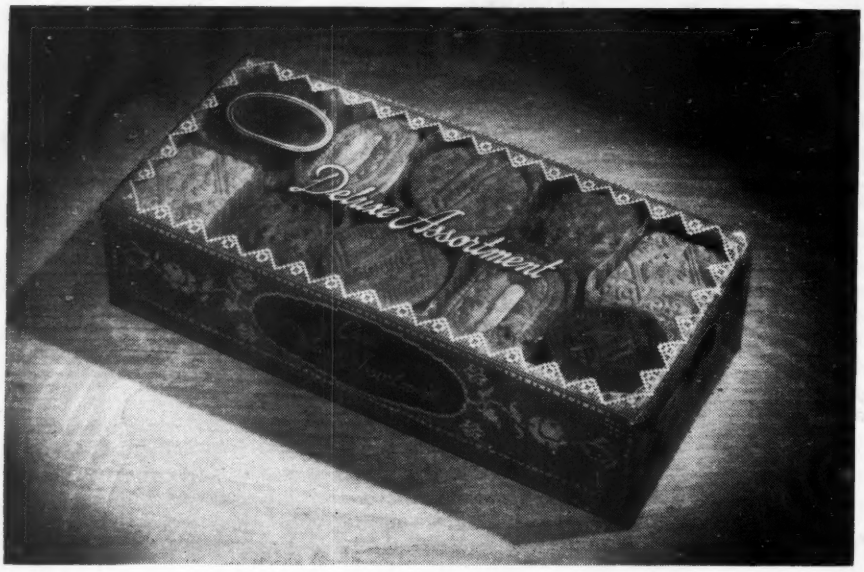


Biscuits in a Window

AN attractive new package is used by J. B. Carr Biscuit Co., Wilkes-Barre, Pa., for its Deluxe Assortment

The 14-oz. assortment comprises sandwiches, small chocolate bit cookies and plain wafers. Soya flour and lecithin are listed among the ingredients of these assorted products, with flour, sugar, shortening, chocolate, cocoa, nuts, imitation flavoring, corn sugar, salt and leavening.

The package consists of a simple greaseproof boxboard tray. A fluted wax strip is used to line the tray and also to separate the piles of cookies. A heat-sealed cellophane overwrap supplies product protection and also forms a decorative label. A lace pattern, white against a red background, covers the sides of the tray. The top is clear. Blue and gold are used in ovals bearing the company name, appearing both on the top and sides.

The cellophane is printed by rotogravure, and supplied in continuous rolls. Both the design and the printing are by Milprint, Inc., Milwaukee, Wis.

Winery Turns to Jams

PRODUCED first to meet government contracts, the preserves made by Ambrose and Co., Denver, Colo., are now on the retail market.

This company formerly devoted itself entirely to the manufacture of American wines. A new plant was built to meet its jam contracts. The Ambrose line of preserves now includes cherry, apricot, apricot and cherry, blackberry, nectarine, plum, peach, gooseberry, Satsuma plum and grape.

These products meet the standard of identity for pure fruit preserves. The cherry and peach contain notably large pieces of fruit, while some of the others are smooth and heavy. Processing has been so carried out that the colors are bright and clear.

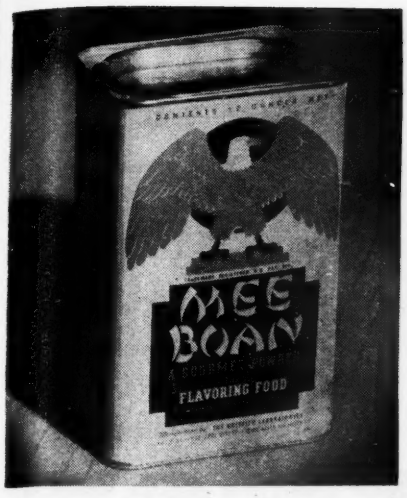
Standard glass jars with vacuum-seal pry-off caps are used for 1- and 2-lb. packs. Institutional needs are met with 10-lb. jars.

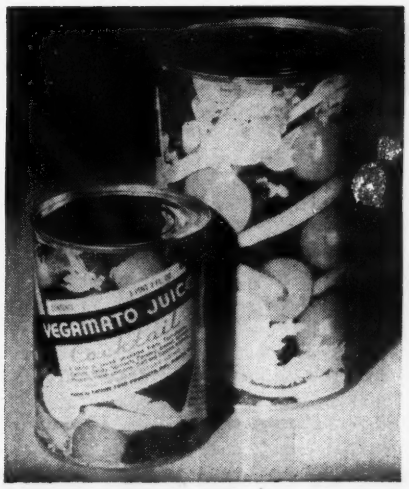
The label is printed in dark blue and light green, with the company name in red. White caps have the Ambrose trademark in green and dark blue letters.

Seasons Everything

VEGETABLE protein derivative (an artificial flavor) is being put on the domestic market by Griffith Laboratories, Chicago. This white crystalline powder is not itself a flavoring, but, as the Chinese have known for centuries, it enhances and intensifies other flavors with which it is used.

Mee Boan, "a gourmet powder for flavoring food," is packed in a container with metal ends and a heavy coated boxboard body, holding 12 oz. A red eagle, and red and white printing against a dark blue panel, make a striking face design

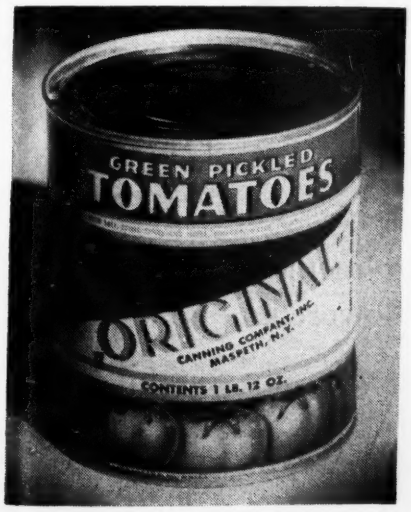




on the white package. The back and one side contain the same information reproduced in Chinese characters.

Green Tomatoes

POLISH STYLE whole pickled green tomatoes are being canned by Original Canning Co., Inc., Maspeth, N. Y. The tomatoes are not large, 1 to 2 in. in diameter, and are processed so that they remain firm throughout. The brine is mild flavored, made with salt, edible spices and herbs, vinegar, water and tartaric acid.



The label, green strikingly printed in yellow and red, states that the pickles are made by the same recipe and are of the same quality as those packed in Poland since 1892. The can contains 1-lb., 12 oz.

Mixed Juices

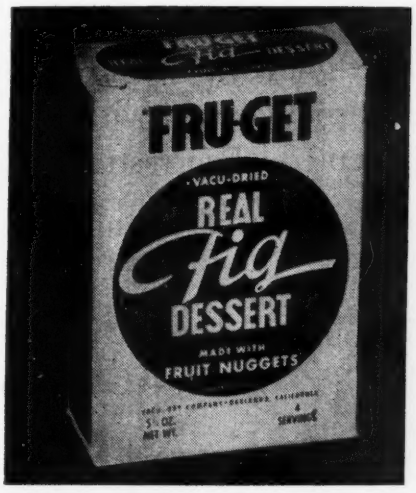
TOMATO JUICE is combined with that of carrots, celery, spinach, parsley, beets, sweet green pepper and fresh lemons in Vegamato Cocktail by La Choy Food Products Division of Beatrice Creamery Co., Archbold, Ohio. The blended juice is seasoned with salt and spice.

Cans hold either 18 oz. or 1 qt. 14 fl. oz. The label has an allover picture of the fresh vegetables in full color A yellow panel adds to the bright effect.

The product is at present available in a number of the larger cities. Wider distribution is planned.

Fruit Dessert

FRUIT NUGGETS, dehydrated dried fruit pellets, are scattered liberally throughout a dessert mix being introduced by Vacu-Dry Co., Oakland, Calif. (See Food Industries, April, 1944, page 67.) The powder contains dextrose, both cornstarch and gelatine, salt and citric acid. U. S. certified color is added. Peaches, apricots and bananas contain a small amount of sulphur dioxide introduced in drying, figs and prunes are processed without sulphur treatment



Enough for four servings, 5½ oz., is packed in a heavy heat-sealed waxed bag, inside a folding box. Printing is in two colors, selected in each case to suggest the fruit.

For the
final steps
on
PROTECTIVE PACKAGING

SOLSEAL
WATER-RESISTANT TAPE

MEETS ORDNANCE SPECIFICATION AXS-1213

For WATER-RESISTANT TAPE

SOLSEAL Water Resistant Tape is made expressly to meet U. S. Ordnance Specification AXS-12-13, under which the use of water repellent tapes on certain shipments is now mandatory. SOLSEAL is recommended particularly for the sealing of interior waterproof packages for overseas shipments. Get in touch with your McLaurin-Jones distributor, or with us, for samples.

SOLSEAL
LABEL PAPER

FOR SHIPMENTS REQUIRING WATER-RESISTANT LABEL PAPER

For labeling overseas packages . . . for labeling any shipments on which water-resistant labels are required . . . suggest SOLSEAL Water-Resistant Label paper.

Made of 60 lb. Kraft, SOLSEAL is not only water-resistant, but will withstand the effects of heavy humidity . . . even actual immersion in water, as well as temperature extremes. It adheres firmly to fibreboard containers, to glass, and to some metals. Ask your merchant for samples and complete details about McLaurin-Jones Solseal Label Paper.

McLAURIN-JONES CO.
492 MacLaurin St., Brookfield, Mass.
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and now vitamin C is OFF allocation

GOOD NEWS INDEED!

¶ With C off allocation, all three of the water-soluble vitamins most needed for food enrichment are again available with *no* restrictions.

¶ Meanwhile, because of improvements in manufacturing methods worked out under pressure of wartime needs, costs have been materially lowered.

¶ This makes the good news doubly good, not alone for those already committed to enrichment or restoration of their products with vitamins B_1, B_2 or C, but also for those whose potential use was prevented when restrictions were put in force.

¶ The way is also clear now for use of ascorbic acid as an antioxidant in certain types of food products.

¶ If you have not already been in touch with our Vitamin Division, we suggest you now address us. Also available: 'Roche' B_6—Calcium Pantothenate—Niacin—Niacinamide—and Vitamin E Acetate.

VITAMIN DIVISION

HOFFMANN-LA ROCHE, INC. • • • • NUTLEY 10, N.J.

FOOD INDUSTRY NEWS

DEVELOPMENTS IN DISTRIBUTION

Improved Steel Strip Supply Is Reflected in WPB's New Can Order

Black plate is now easier, but the 1945 supply of tin for the manufacture of tin plate will not be increased

REVISION of the can order, M-81, announced the first of the year, reflects the easier position of steel strip, the continuing shortage of metallic tin and the growing shortage of paper and cartons. During 1945, untinned sheet steel may be used for cans and for closures of glass containers without quota restrictions. The order retains nearly all the previous restrictions on the use of tin plate for packaging. Food processors are assured of receiving their requirements by a clause in the order which requires can manufacturers to supply cans for military needs and for packing food before other types of cans are produced.

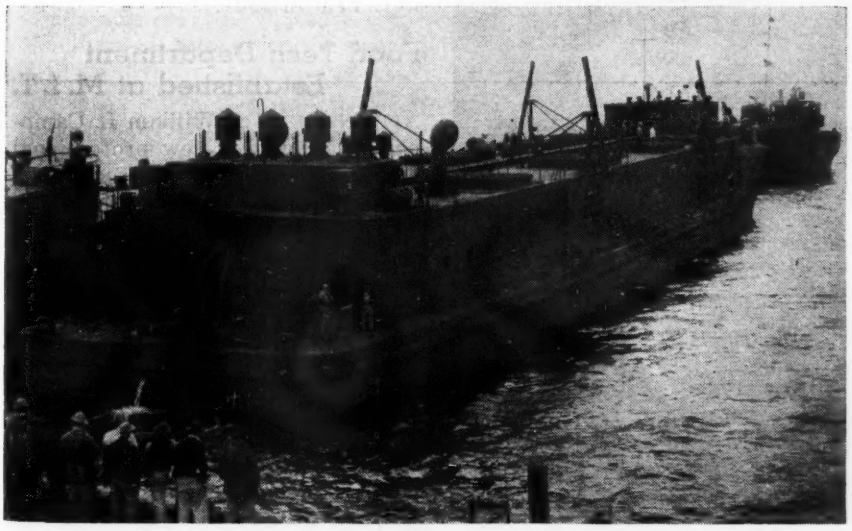
Supplies of tin for the manufacture of tin plate will not be increased. The War Production Board reports that aside from the comparatively small amounts of tin that are produced in Bolivia, Australia, Africa and Alaska, the only other major source will continue to be salvaged tin cans. The salvage drives for tin cans and waste paper are the only two of the nine government's salvage drives being actively pressed at this time.

The easier supply of black plate is expected to permit metal containers to be re-substituted for paper packages and cartons. However, the War Production Board has cautioned that untinned metal containers may not be available for some time and that there is no guarantee that strip steel will continue to be available in the present quantities.

Dehydrated Vegetables Undergo Sales Test

A NUMBER of dehydrated vegetables went on sale in 30 to 40 regular retail grocery stores throughout Grand Rapids, Mich., in January, in a 6-month sales test to determine consumers' reactions to these products. This study, by the National Dehydrators Association and other representatives of the vegetable dehydration industry, in cooperation with the Farm Credit Administration, is being made to determine how consumers will react to dehydrated products marketed under normal conditions, with conservative advertising and display methods.

The products being tested include dehydrated beets, onions, carrots, diced white potatoes, Julienne white potatoes and diced sweet potatoes. They will be marketed under a common "Hy-Rated" brand name and the labels will state "Packaged for the National Dehydrators Association" and will bear that association's "Approved Quality" seal. The products will retail at reasonable prices, consistent with the cost of production



CONCRETE REFRIGERATION BARGE

Here is the first refrigerated cargo ship of its kind to leave the yards of Concrete Ship Constructors, National City, Calif. The vessel provides 135,000 cu. ft. of refrigerated space in its reinforced concrete hull. Circulating cold air type refrigeration is used and is distributed through ducts mounted on the outer walls of the marine plywood deck house. Five tons of ice per day can be manufactured on board as can 500 gal. of ice cream.

Military Food Need Multiplies Since 1941

MILITARY requirements for processed foods have jumped from 7 percent of the 1941-42 pack, representing 25,600,000 cases, to 41 percent, or 150,400,000 cases, of the 1944-45 pack, according to a recent OPA resume. While farmers, food processors and distributors pushed production to an all-time high in 1944, civilians will get only about two-thirds of the commercially canned goods that were available to them in 1941.

The WFA estimates that total supply of meat in 1945 will be down about 2,000,000,000 lb. There will be just that much less meat available to the civilian market, for the armed forces will continue to get what they need. This means that about 127 lb. per capita will be available to civilians, as against 148 lb. in 1944.

Truck Operators May Expect Cut in Tires

PRESENT indications are that commercial motor vehicle operators will receive only about one-half of their estimated tire requirements during the first quarter of 1945, according to Col. J. Monroe Johnson, director of the Office of Defense Transportation.

The urgent military demand for tires for combat vehicles, trucks, jeeps and other military transport was given as the reason for the drastic cut in the tire supply.

Eggs Weather Test of Dry Cargo Shipment

EXPERIMENTAL shipments of shell eggs as non-refrigerated cargo have been made recently by the Army in an effort to circumvent limitations on refrigerated ship space.

While test shipments have been made to the European, and to the South and the Southwest Pacific theaters, the only reports, thus far, have come from the Southwest Pacific. Condition of the eggs on arrival in that area fully justified the shipments, according to the commanders, who have asked for additional shipments.

Grapefruit Juice Put Under Heavy Set-aside

SET-ASIDES of 100 percent of production were clamped on grapefruit and blended citrus juices by WFA in the middle of January. The government had previously announced a similar set-aside for California pilchards, Pacific mackerel and Pacific horse mackerel. Requirements on spray process nonfat dry milk solids have been increased from 40 to 50 percent during February and March.

A rise in the set-aside demands for Cheddar cheese from 25 to 30 percent was seasonal according to WFA. The agency said that as soon as the demand for citrus juices are met the drastic set-aside order for that commodity will be revoked.

Lard in Storage Test Ends at Soap Makers

ANNOUNCEMENT of the sale of approximately 20,000,000 lb. of off-condition prime steam lard by WFA, as agent for the Army, marks the end of a noble experiment. It was claimed that by the use of lacithin antioxidant the lard could be stored in this country outside of a cold storage warehouse. It was tried and did not work. Rumor has it that the amount of free fatty acid in the lard was so great that any attempt to refine it for edible purposes would have been too costly. Instead of taking a heavy refining loss, the decision apparently was to turn it over to the soapers.

Lend-Lease Declines

DELIVERIES of food and other agricultural products for shipment to the allies under Lend-Lease during 1944 totaled 7,272,000,000 lb. compared with 1943 deliveries of 11,488,000,000 lb.

F&DA Plans Inspection Of Baby Food Plants

FOOD and Drug Administration executives confess that they intend to go after baby food plants intensively as rapidly as competent personnel can be made available. They believe that they will be backed by public opinion and the courts in an effort to clean up, in a superlative fashion, the establishments that specialize on baby food.

Inspections have been made in a routine manner thus far and "distressing conditions" have been noted in quite a number of establishments.

High Vitamin C Content Asked for Tomato Juice

THE American Medical Association, through its council on foods, is undertaking to raise the standard of commercial tomato juice by fixing a minimum content of vitamin C. In a recent session, the council adopted a resolution intended to limit its seal of acceptance to plants that could meet the requirement of 20 milligrams of vitamin C per 100 grams of juice.

Canners point out the practical fact that neither government nor industry results show anything like that high figure for most commercial packs. Only a few California packers have reached that standard at all regularly.

Critics of the new proposal suggest that this might lead to compulsory fortification by adding synthetic vitamins. They also question means available for policing under the rule. And finally the question is raised whether an initial pack meeting the standard would reach the average consumer at the expected level, because present information indicates clearly a slow but steady decline in vitamin C in tomato juice during storage.

WILLIAM L. CAMPBELL

For ten years general manager of Kroger Grocery & Baking Co., and production consultant to the Army and Navy for three years, he now heads MIT's new food technology department.

Macaroni Standards Fixed Then Changed

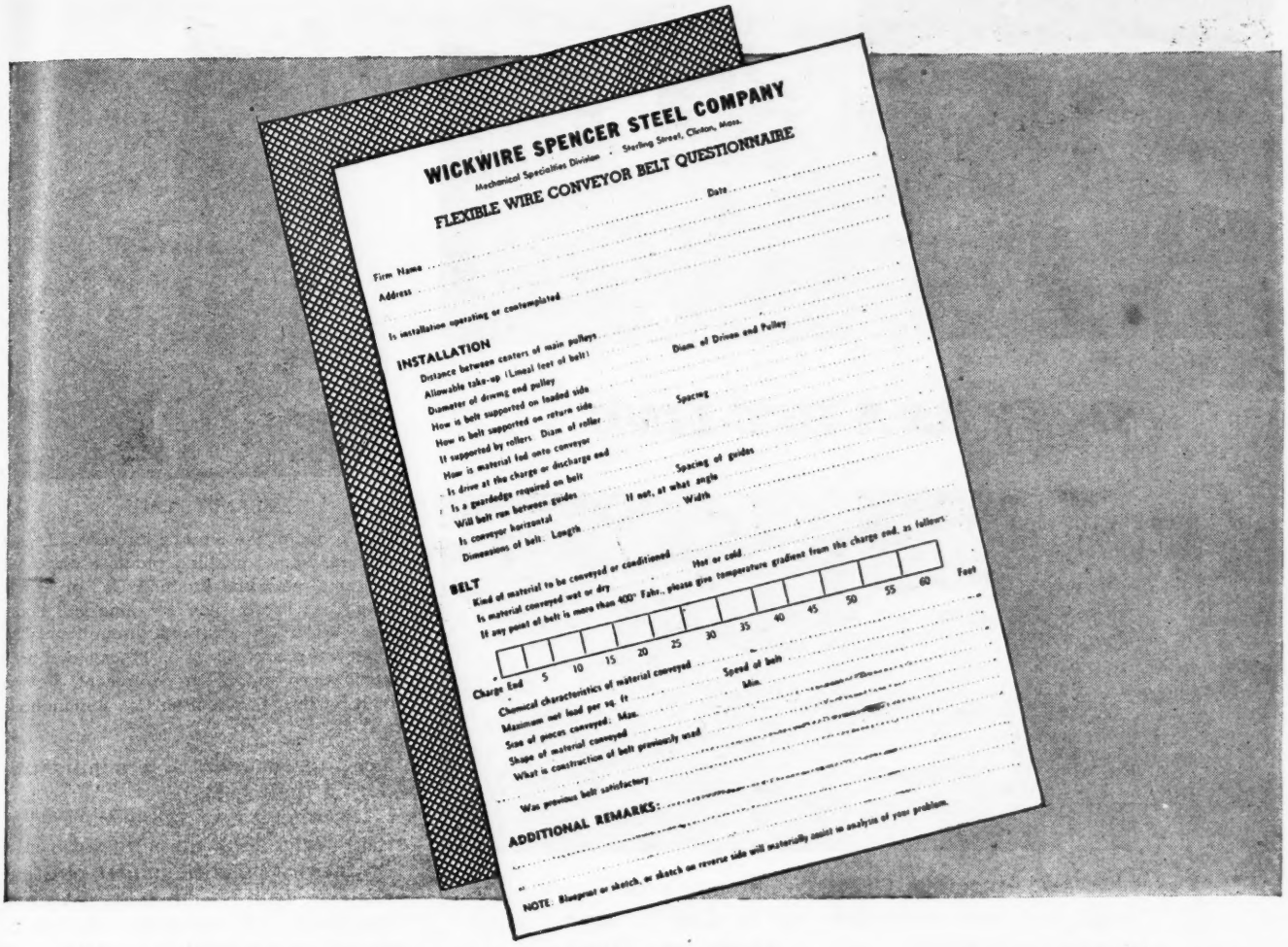
ON DECEMBER 23 the Food and Drug Administration promulgated new definitions and standards of identify for macaroni, spaghetti and related products. In the very next issue of *Federal Register*, on December 27, the effect of these standards restricting enrichment with vitamins and minerals was suspended and a new hearing called in order to amend extensively the first order.

On January 29, the new hearings began to make a record for the membership of the National Macaroni Manufacturers Association as to the desirable addition of vitamins and nutrient minerals. On the basis of this hearing record, it is expected that there will be a large extension of the original standards in line with the wish of the industry to manufacture and market enriched products, which parallel enriched flour and bread. This new record is necessary since the earlier hearings were held in 1941.

Food Tech Department Established at M. I. T.

APPOINTMENT of William L. Campbell as head of a new professional department of the Massachusetts Institute of Technology, devoted to education and research in food technology, was recently announced by Dr. Karl T. Compton, president of the institute. Associated with Professor Campbell in the new department will be Professor Bernard E. Proctor, whose appointment as director of the Samuel Cate Prescott Laboratories of Food Technology was recently announced. The new department includes and extends the scope of these research laboratories.

The objective, in addition to fundamental research leading to new developments in industry, is to train food technologists who will have the professional qualifications essential for leadership in research, develop-

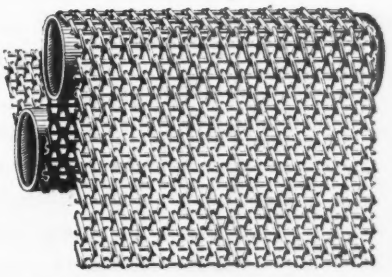

WICKWIRE SPENCER STEEL COMPANY
Mechanical Specialties Division · Sterling Street, Clinton, Mass.
FLEXIBLE WIRE CONVEYOR BELT QUESTIONNAIRE
Date
Firm Name
Address
Is installation operating or contemplated
INSTALLATION
Distance between centers of main pulleys
Diam. of Driven and Pulley
Allowable take-up (Lineal feet of belt)
Diameter of driving end pulley
How is belt supported on loaded side
Spacing
How is belt supported on return side
If supported by rollers Diam. of roller
How is material fed onto conveyor
Is drive at the charge or discharge end
Is a guardedge required on belt
Spacing of guides
Will belt run between guides
If not, at what angle
Is conveyor horizontal
Width
Dimensions of belt Length
BELT
Kind of material to be conveyed or conditioned
Hot or cold
Is material conveyed wet or dry
If any point of belt is more than 400° Fahr., please give temperature gradient from the charge end, as follows:
Charge End 5 10 15 20 25 30 35 40 45 50 55 60 Feet
Chemical characteristics of material conveyed
Maximum net load per sq. ft
Speed of belt
Min.
Size of pieces conveyed: Max.
Shape of material conveyed
What is construction of belt previously used
Was previous belt satisfactory
ADDITIONAL REMARKS:
NOTE: Blueprint or sketch, as sketch on reverse side will materially assist in analysis of your problem.

W. S. METAL CONVEYOR BELTS ARE *CUSTOM-ENGINEERED* FOR MAXIMUM MAINTENANCE ECONOMY

Naturally you expect a conveyor belt to reduce handling costs, speed production, provide more uniform results and require a minimum of maintenance. The achievement of these results involves careful consideration of the size, shape and weight of the product to be handled, belt speed, temperature range and other unusual conditions to which the belt must be subjected.

That's why we first determine your needs. Then we custom-engineer a belt that will give you the greatest load capacity per unit of weight. We make belts that operate efficiently at temperatures as low as —40° F. or as high as 2100° F., and that give long economical service under chemical action and other destructive forces. Belts are made from any alloy capable of being drawn into wire—steels, brass, bronze, monel, inconel or heat-resistant alloys, in any length and in widths varying from 1″ to 192″.

Write for our valuable reference book showing types and advantages of numerous metal conveyor belt constructions. Address: Mechanical Specialties Division, General Sales Office and Plant, Sterling St., Clinton, Mass.



FLEXIBILITY? Wickwire Spencer Conveyor Belt construction permits operation over small diameter pulleys, insuring extreme flexibility and economy in design.

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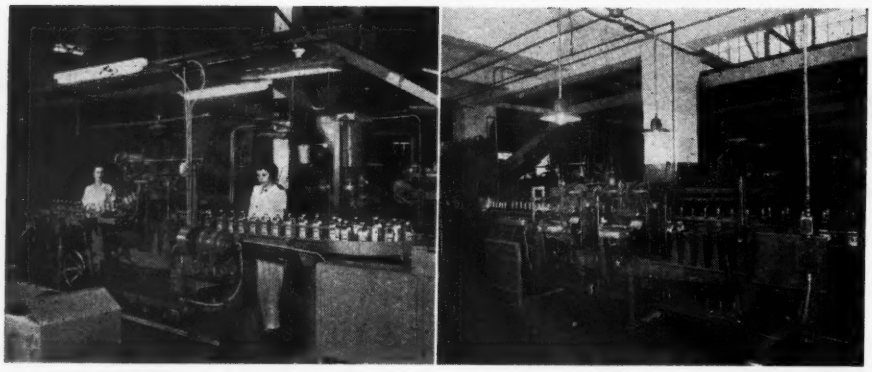

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WORLD Automatic BEE-LINE Straightaway Labelers got into production just in time to save overworked bottlers many a headache. Users tell us they don't know how they'd have gotten through the emergency without the BEE-LINE.

This WORLD welcomes round, square, flat, oval or panel bottles — conducts them swiftly, surely and gently in a **bee line** from start to finish, without traffic jams, detours or collisions. It's ideal for the modern light weight glass containers.

Whatever your future labeling calls for — full automatic or semi-automatic application of front or front and back body labels and neck labels — WORLD labeling headquarters has the one best Labeler for the job. Ask us to prove it.

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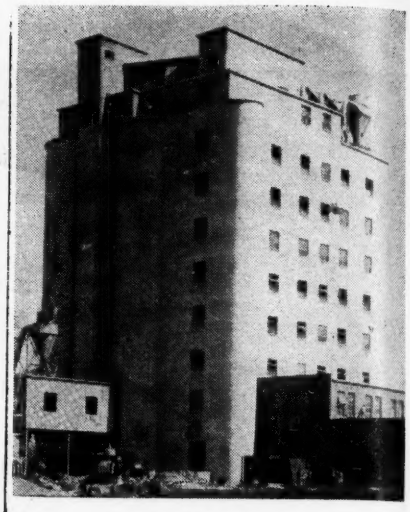

PEANUT PLANT

This is one of the world's largest and most modern peanut shelling plants. Completed for the Greenwood Products Co., at Graceville, Fla., its six silos and nine mill floors are electrically powered throughout. The plant has a capacity of 5,000 tons, and uses suction-type unloading equipment. It was built by Rust Engineering Co., Birmingham.

ment, production and administration in their field.

Discussing research in the field of food technology on a broad scale, Professor Campbell pointed out that modern food technology requires knowledge of virtually all fundamental sciences and engineering, and said that the institute with its technical resources in personnel and facilities, therefore, offers an ideal center for expansion of the institute's long-established research in food technology. He added that this research will attack such fundamental problems of the food industry as retention of natural flavor, color, nutritional value and quality, and will then aid industry as well as contribute to science. Many advances have been made in the field of nutrition that will be utilized in the food technology research program.

The war with its special feeding problems has done much, Professor Campbell said, to stimulate research in the food field and there is every reason to believe that further research will bring many new developments in civilian feeding. Among the new developments to be expected, he said, will be less work for the housewife in preparing meals, lower prices, higher quality, better flavor and greater nutritional value. Likewise, new products, at present unfamiliar, may be expected to appear in the market. These advances will keep the 50,000 food factories in this country in the position of world leaders and will be of importance in supporting agriculture.

Save MAINTENANCE TIME

with
WALWORTH
FIG. 709
Saddle Gate
VALVE

Bronze
STEM
STEM NUT
STUFFING NUT
GLAND
BONNET BUSHING
WEDGE
SEAT RING

THE *Iron Valve* WITH *Bronze* WHERE IT'S NEEDED

If you want to reduce valve maintenance time on lines where frequent cleaning and inspection are required — specify Walworth Fig. 709, the bronze-mounted Iron Body Saddle Style Wedge Gate Valve.

Easy to take apart because of its U-bolt body-to-bonnet connection, this valve permits quick inspection, easier cleaning, and rapid re-assembly, and can be re-packed under pressure in either the open or closed position. It is recommended for general use on steam, gas, gasoline, water, oil, and process lines, and is especially suited for lines carrying sludge, fluids of high viscosity, or mixtures which might have a tendency to clog under the disc or between the valve seats.

Walworth Fig. 709 is made with bronze wedge, seat rings, stuffing nut, gland, bonnet bushing, stem and stem nut. The bonnet and body are made of cast iron. Two drain holes located inside the bonnet permit the line fluid to drain off when the valve is open, thus eliminating the danger of serious damage due to freezing. This valve is furnished with either screwed or flanged ends, in sizes from ¼" to 4".

All Iron Valve

For services where line fluids are corrosive to bronze trim, Walworth offers Fig. 711, an iron body valve which has malleable iron wedge disc and stuffing nut, and steel gland and rising stem. This valve is available in sizes from ¼" to 4" (Screwed), and 1" to 4" (Flanged).

For further information on these Walworth Valves — and details on Walworth's complete line of valves and fittings — write on your company letterhead for a free copy of Catalog 42.

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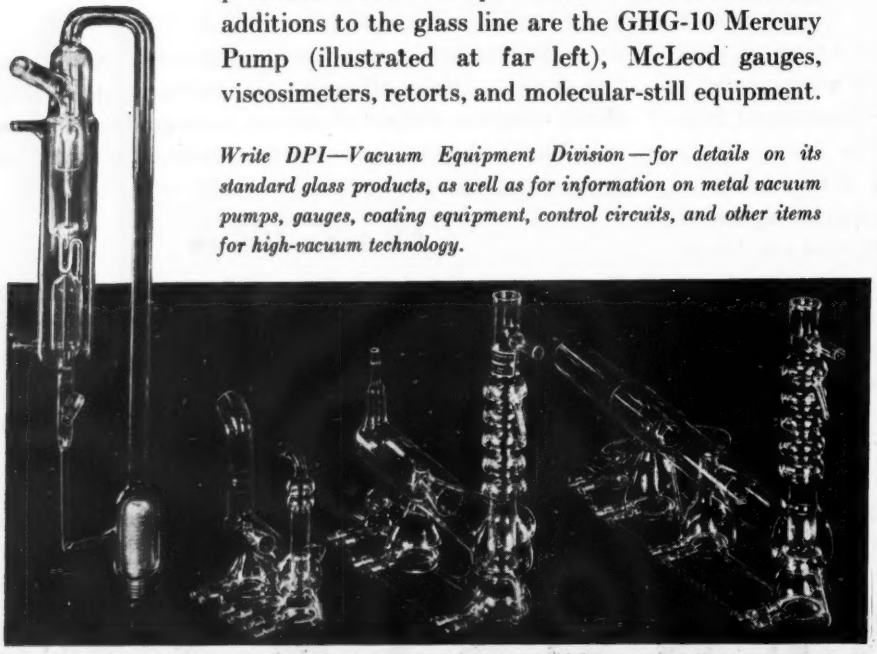
DISTILLATION PRODUCTS' highly expert glass-fabrication service produces the famous DPI fractionating diffusion pumps and other important aids to high vacuum. Furthermore, DPI carries on constant research in this field, both to improve present products and to develop new ones. Some of the recent additions to the glass line are the GHG-10 Mercury Pump (illustrated at far left), McLeod gauges, viscosimeters, retorts, and molecular-still equipment.

Write DPI—Vacuum Equipment Division—for details on its standard glass products, as well as for information on metal vacuum pumps, gauges, coating equipment, control circuits, and other items for high-vacuum technology.



DP INC. HIGH-VACUUM HEADQUARTERS

DISTILLATION PRODUCTS, INC.

Jointly owned by EASTMAN KODAK COMPANY and GENERAL MILLS, INC.

ROCHESTER 13, N. Y.

from 10 percent to 15 percent that may sink in 14½ percent salt solution.

"2. Some recommendations have been received on Sweet peas in Grade B or Extra Standard (No. 5 and larger and blends including No. 5 or larger) to change the percentage of salt from 13½ percent to 13 percent and from 14½ percent to 14 percent. This recommendation, however, does not appear to have general acceptance from all pea canning areas."

The industry reports should be sent to Processed Products Standardization and Inspection Division, Fruit and Vegetable Branch, War Food Administration, Washington 25, D. C.

Priorities Lifted On Food Equipment

FOOD processing equipment now may be purchased on unrated orders. An amendment to the controlling order, L-292, has removed the requirement of an AA-5 rating or better before equipment may be purchased. This will relieve both the processors and the machinery manufacturers of much red tape in the future.

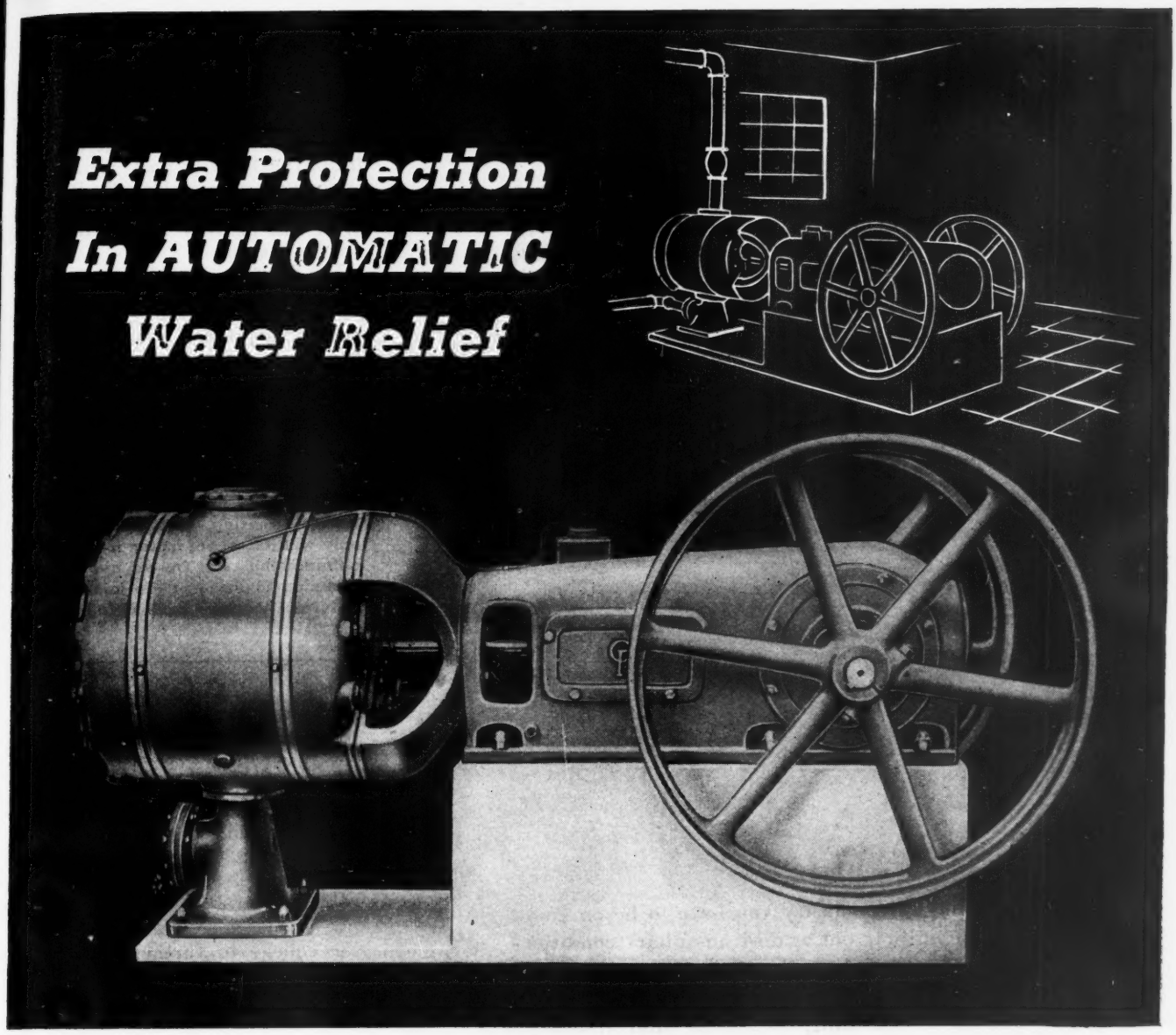
The amendment does not mean that any more equipment will be available, since production quotas were not changed. Prior to the present amendment, however, manufacturers' quotas were based on the number of rated orders they received. Now, since no rated orders are necessary, individual production quotas have been assigned to machinery manufacturers wherever necessary.

Ample provision is made in the amended version for priority assistance, if needed, to secure machinery and repairs in an emergency.

Sugar Research Seeks New Industrial Uses

FOR scientific research on new industrial uses for sugar and on its role in the human diet, six additional grants totaling over $250,000 were awarded recently by the Sugar Research Foundation to scientists in various universities. Included in the scholarship grants is the University of California, Division of Food Technology, which will conduct research on uses of sugar in frozen food processing. Dr. W. V. Cruess and Dr. L. A. Hohl of the University of California will administer the fellowship.

Following the program of the Foundation, which is sponsored by leading members of the beet and can sugar industry, Dr. Robert C. Hockett, New York, is visiting nine western universities to discuss means of bolstering the postwar market.



CP SINGLE AND DUPLEX DRY VACUUM PUMPS

ONE of the discharge assemblies in each end of the cylinder of a CP Horizontal Vacuum Pump is arranged as a special automatic valve. Should a slug of liquid be accidentally drawn into the cylinder the relief valve assembly will lift off its seat against a heavy spring, providing extra escape area for the liquid and minimizing the danger of damage to the pump. This is an exclusive CP feature.

The durable Simplate Valves are located in both cylinder heads parallel to the piston face, affording low valve clearance and high volumetric efficiency at high vacua.

Arranged for belt, motor or steam drive, CP Horizontal Single and Duplex Dry Vacuum Pumps are available in capacities up to 15,000 c.f.m. Two-stage pumps available for very high vacua. Write for complete information.

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In the food industry you have to be on guard day in and day out against unsanitary conditions in your plant. And cleaning is becoming more important than ever as new equipment, new techniques of handling, processing and packaging food present new problems in plant sanitation.

For help in foiling dirt, call your Wyandotte Representative. He has a full line of products that will solve *any* cleaning difficulty for you quickly, efficiently and safely. Backed by Wyandotte research and experience, he's an expert at applying these products to the cleaning of utensils, equipment and containers, in all kinds of plants.

He has an effective germicide, too. Wyandotte Steri-Chlor* is easy to use and safe — but it spells swift death to bacteria anywhere in your plant.

The Wyandotte Representative is always at your service. Get in touch with him today.

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WYANDOTTE, MICHIGAN • SERVICE REPRESENTATIVES IN 88 CITIES

New Frozen Foods Directory

A new edition of the "Frozen Foods Directory" is now being printed. It will be published as a seperate publication and not included in an issue of FOOD INDUSTRIES, as in past years. Those wishing copies may obtain the Directory by writing to FOOD INDUSTRIES, 330 West 42nd St., New York 18, N. Y. The price is 50 cents.

This directory constitutes an authoritative manual of the rapidly expanding commercial frozen food industry, containing information supplied by the freezers themselves. It will list the freezers in alphabetical order and name the executives, products frozen, brands, types of containers used, freezing systems employed, and tell where the freezing plants are located.

It is the function of this Directory to tell the "who, what and how" of commercial freezing. This information not only will tell where frozen foods may be obtained but will be an aid in future planning to those in the freezing business and to those contemplating entering it. — THE EDITORS.

Michigan State Plans Research in Nutrition

AN Institute of Nutrition has been established at Michigan State College to coordinate and integrate instruction and research in nutrition, and to bring together workers in this broad field.

This institute is planned to supply a contact between industry and the college to further research in food and nutrition and will supply the food industry with results of the laboratory.

Michigan State also has established a Food Technology course, the curriculum for which will appear in a forthcoming issue of FOOD INDUSTRIES.

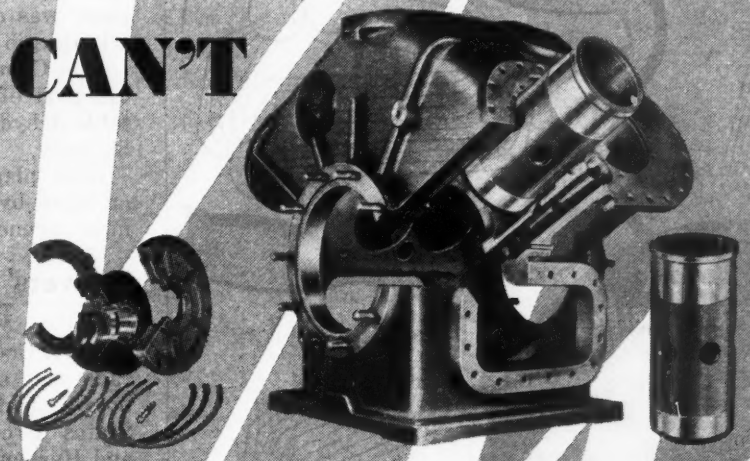
Reestablishes School At QMC Chicago Depot

TO MEET the need for field officers trained in subsistence activities, Quartermaster General Edmund B. Gregory has reestablished the QMC subsistence school at the Chicago depot. Colonel Rohland A. Isker has been named commandant in addition to his duties as director of the QMC Subsistence Research and Development Laboratory and chief of the Subsistence Section, Military Planning Division, Office of Quartermaster General.

The first class of 23 officers will be graduated on March 3, at the end of a 13-week course in mess management, garrison and field bakery supervision, methods of inspection, and problems of storage and handling. They will then be given spe-

YORK

THEY CAN'T



WEAR OUT!

Because they are so constructed that all parts which may be subjected to wear can be removed easily for inspection or replacement, it may be truly said that York V/W Compressors for air conditioning and refrigeration applications as units will never wear out. For example, cylinder sleeves as well as bearings, connecting rods, etc. may be readily replaced.

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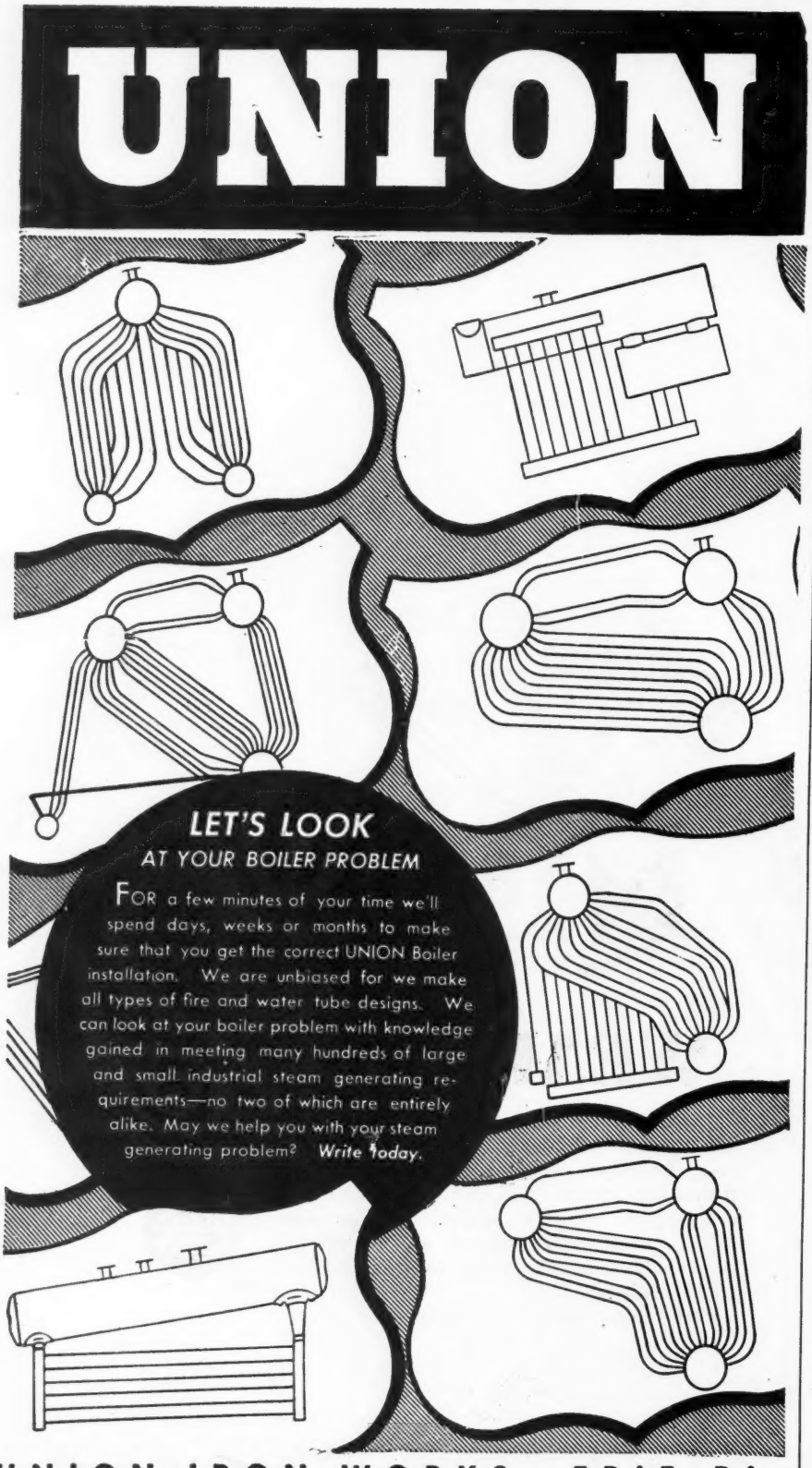
air conditioning

REFRIGERATION

COMPRESSORS

YORK REFRIGERATION AND AIR CONDITIONING

HEADQUARTERS FOR MECHANICAL COOLING SINCE 1885


UNION
LET'S LOOK
AT YOUR BOILER PROBLEM
FOR a few minutes of your time we'll spend days, weeks or months to make sure that you get the correct UNION Boiler installation. We are unbiased for we make all types of fire and water tube designs. We can look at your boiler problem with knowledge gained in meeting many hundreds of large and small industrial steam generating requirements—no two of which are entirely alike. May we help you with your steam generating problem? Write today.
UNION IRON WORKS • ERIE, PA.
BOILERS
PRESSURE VESSELS • PLATE FABRICATION

cific field assignments in subsistence work, which should result in improved utilization of processed foods by the Army.

Two Dehydration Plants Offered by Government

GOVERNMENT acquistion of the Kern County Dehydrating Co. plant at Bakersfield, Calif., and Compac Foods, Inc., at Santa Ana, were recently announced by WFA and the Defense Plant Corp., respectively.

The $250,000 plant at Bakersfield is one of the largest of its kind in California, with a capacity of 20 dry tons of potatoes per day. Constructed in 1943, it is equipped with six primary and six secondary drying tunnels and preparation equipment for processing potatoes, carrots, onions and raisins. The plant was operated recently by the Di Giorgio Fruit Co.

The Compac plant, in the southern part of California, has a vegetable dehydrating capacity of 8,000 lb. daily.

Both plants are offered for sale or lease by the respective government agencies.

Brewers' Foundation Elects New Officers

ADOLPH COORS, Jr., of Golden, Colorado was elected chairman of the board of directors of the United States Brewers Foundation, Inc., and Herbert J. Charles of St. Paul, Minn., was named president, at a meeting of the board in Chicago. The meeting was held in lieu of the scheduled 69th annual convention.

Carl W. Badenhausen of Newark, N, J., was named 1st vice-chairman and Richard G. Jones of New Orleans, La., second vice-chairman. Edward V. Lahey, New Bedford, Mass., was re-elected treasurer and C. D. Williams was reelected secretary.

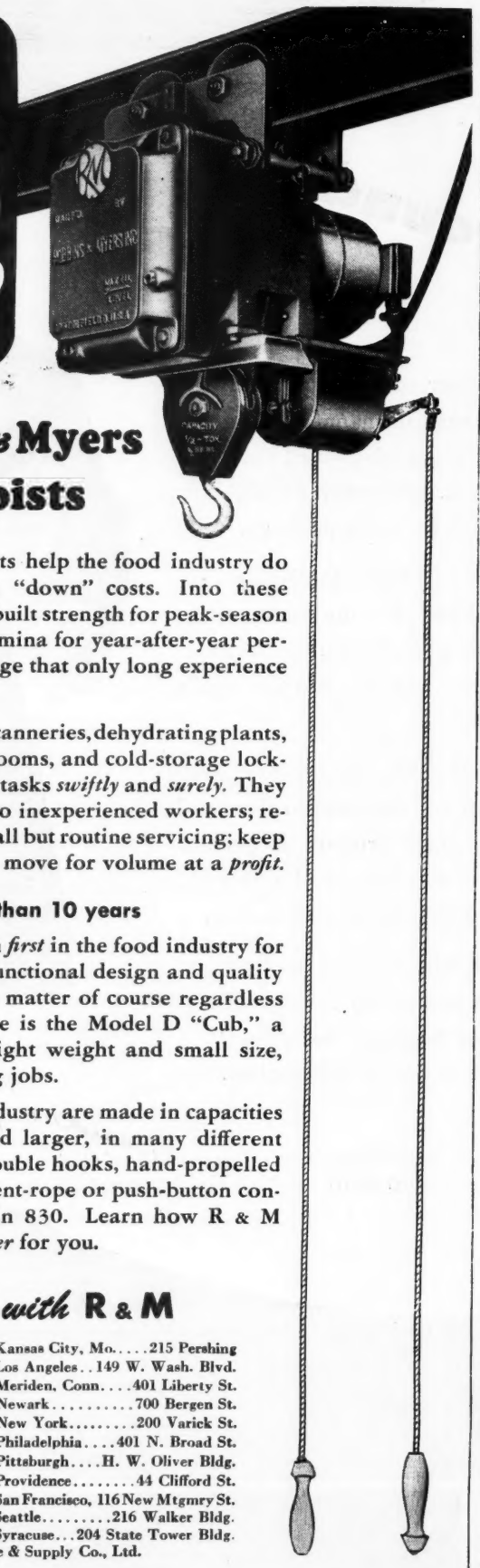
New QMC Specifications

THE Quartermaster Corps has issued the folowing specifications. They are listed with the Chicago Quartermaster Depot number and date of issue:

Packaging and Packing Fresh, Chilled or Frozen Meat Cuts and Sausage Products for Domestic and Overseas Shipment, C. Q. D. No. 348, Nov. 14, 1944. Canned Chop Suey, C. Q. D. No. 331, Nov. 21, 1944. Chicken and Vegetables, C. Q. D. No. 303A, Nov. 23, 1944, Superseding C. Q. D. No. 303, July 20, 1944. Canned Ham with Raisin Sauce, C. Q. D. No. 189A, Nov. 23, 1944, Superseding C. Q. D. No. 189, June 30, 1944. Yeast, C. Q. D. No. 47A, Nov. 28, 1944, Superseding C. Q. D. No. 47, June 1, 1942. Processing Army Beef, C. Q. D. No. 305A, December 12, 1944, Superseding C. Q. D. No. 305, July 26, 1944. Biscuits and crackers, C. Q. D. No. 176B, Superseding C. Q. D. No. 176A, June 12, 1944. Humidity Resistant Safety Book Matches, C. Q. D. No. 127A, Nov. 16, 1944, Superseding C. Q. D. No. 127, May 21, 1943.

★
Proving ground for your product
The final result of all your research, your raw material control, your skill in manufacturing is placed in a package and sealed—and your reputation sealed with it. From then on it's all out of your hands—it's up to the package.
You won't be in store and home to display your product as you'd like, but the package can. *You* won't be there to make your package easy to open and close, and use and use again—but the closure can.
That's why so many manufacturers, with products they're proud of, use Anchorglass and Anchor caps—to *keep* their product as perfect as they made it, all the way into the home and to the satisfactory use that means re-orders.
Write us today. We will be glad to work with you to increase your sales and profits with *packages that protect* the maker's reputation.
"Meet Corliss Archer" every Thursday evening, entire Coast-to-Coast Network CBS.
Anchor
CONTAINERS and CAPS
PRODUCTS OF
ANCHOR HOCKING GLASS CORPORATION
LANCASTER, OHIO

LIFT COSTS LOWER



with Robbins & Myers Electric Hoists

Robbins & Myers electric hoists help the food industry do two things: "up" production; "down" costs. Into these speedy, dependable hoists are built strength for peak-season operation the year around; stamina for year-after-year performance; specialized knowledge that only long experience can teach.

★ In grain elevators, bakeries, canneries, dehydrating plants, packing houses, fast-freezing rooms, and cold-storage lockers R & M hoists do their daily tasks *swiftly* and *surely.* They lend a welcome helping hand to inexperienced workers; relieve busy maintenance men of all but routine servicing; keep everything orderly and on the move for volume at a *profit.*

FIRST for more than 10 years

R & M electric hoists have been *first* in the food industry for more than 10 years. Simple, functional design and quality construction can be taken as a matter of course regardless of type or model. Shown here is the Model D "Cub," a 1000-pound-capacity unit of light weight and small size, ideal for many food processing jobs.

★ R & M hoists for the food industry are made in capacities from 250 to 2000 pounds, and larger, in many different arrangements with single or double hooks, hand-propelled or motor-driven trolleys, pendent-rope or push-button control. Send for 24-page Bulletin 830. Learn how R & M electric hoists can lift costs *lower* for you.

Take It Up with **R & M**

Albany.....364 Broadway
Atlanta.....319 Walton Bldg.
Baltimore, Lombard & Concord St.
Boston.....74 Needham St.
Chicago.....2400 W. Madison St.
Cincinnati.....418 New St.
Cleveland...470 Rockefeller Bldg.
Dallas.....1100 Cadiz St.
Denver.....1420 16th St.
Detroit.....2921 E. Grand Blvd.
Houston....3715 Harrisburg Blvd.
Jacksonville.....305 Bisbee Bldg.
Kansas City, Mo.....215 Pershing
Los Angeles..149 W. Wash. Blvd.
Meriden, Conn....401 Liberty St.
Newark.....700 Bergen St.
New York.....200 Varick St.
Philadelphia....401 N. Broad St.
Pittsburgh....H. W. Oliver Bldg.
Providence.....44 Clifford St.
San Francisco, 116 New Mtgmry St.
Seattle.....216 Walker Bldg.
Syracuse...204 State Tower Bldg.
Montreal....Lyman Tube & Supply Co., Ltd.

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HOIST & CRANE DIVISION • SPRINGFIELD, OHIO
In Canada: Robbins & Myers Co., of Canada, Ltd., Brantford, Ont.
MOTORS · MACHINE DRIVES · FANS · MOYNO PUMPS · FOUNDED 1878

Food from Brewer's Yeast

BREWING Corp. of America, through its wholly owned subsidiary, Carling's, Inc., plans to spend $250,000 for research looking toward the development of food products from the nutritional values of spent brewer's yeast, according to an announcement by James A. Bohannon, president of Brewing Corp.

C. A. Otis, former president of William Edwards Co., Cleveland, wholesale grocers, has been named vice president of Carling's, Inc. and will guide the program.

More "A" Awards

OUTSTANDING performance in food processing has won the War Food Administration achievement "A" awards for the following food processing plants:

Poultry Producers of Central California, Petaluma, Calif.; J. D. Jewell, Gainsville, Ga.; White City Provision Co., Chicago, Omarga Canning Co., Omarga, Ill.; Perry Packing Co., Manhattan, The Midland Flour Milling Co. (Newton Milling and Elevator Co.), Newton, Kan.; Deerfoot Farms Co., Southboro, Mass.; The Midland Flour Milling Co., North Kansas City, Mo.; The Borden Co., Bainbridge, N. Y.

GENERAL

F&DA Intensifies Fight On Food Contamination

THE fiscal report of the Food and Drug Administration for 1944 finds no significant increase in the number of food poisoning cases, despite wartime conditions and the mass feeding of war workers. There were 73 actual food poisoning investigations, during the year, as compared with 67 in 1943.

The report stated that approximately 67 percent of all food seizures involved charges of filth and decomposition. It pointed to the increasing severity of the courts in dealing with those convicted of producing and shipping such products.

F&DA is intensifying its vigilance over the food producing industry in order to minimize the sale of contaminated foodstuffs, of which only a very small proportion of the industry is guilty, the report indicated.

Accident Rate High In Food Industry

FOR the third successive year the food industry's accident frequency rate rose above that of the previous year, in 1943. The average frequency rate was up 10 percent in the face of an average decrease of 5 percent for all industries. Likewise the industry's severity rate

PEAS
Cans to protect the family's food . . . Crowns to keep drinks right
ICE CREAM
The plastic case for your radio . . . . . And containers, liquid-tight
. . . ARE ALL MADE BY
CONTINENTAL CAN COMPANY
Products and Divisions of Continental Can Co.
100 E. 42nd St., New York 17, N. Y.
CONTINENTAL PRODUCTS: Metal Containers · Fibre Drums · Paper Containers · Paper Cups · Plastic Products · Crown Caps and Cork Products · Machinery and Equipment.
OPERATING DIVISIONS: The Container Co., Van Wert, Ohio · Keystone Drum Company, Pittsburgh, Pa. · Boothby Fibre Can Division, Roxbury, Mass. · Mono Containers, Newark, N. J. · Plastics Division, Cambridge, Ohio · Bond Crown & Cork Co., Wilmington, Del. · Cameron Can Machinery Co., Chicago, Ill.
FOREIGN SUBSIDIARIES: Continental Can Company of Canada, Limited, Sun Life Building, Montreal · Sociedad Industrial de Cuba, S. A., Havana.
Continental—for packaging and plastic products
REPORT TO THE NATION," every Saturday over CBS coast-to-coast network.

HERE'S THE SECOND ad in the new Continental advertising campaign telling folks about all the different things we now make. These ads not only point up the advantages of all kinds of products in cans—they also point out our expanded facilities and complete services. Watch for these full-color ads in such leading national magazines as *Time*, *Newsweek*, *U. S. News*, *Business Week* and *Fortune*. And keep your eye on Continental and the Continental trademark, too. The Triple-C stands for one company with one policy—to give you only the very best in quality and service.

Riqid *TESTS* at every vital step in production quard the dependable *QUALITY* of LUNKENHEIMER VALVES

Nothing is left to chance in producing Lunkenheimer Valves. Exacting tests with the most advanced modern equipment are made at each important point in manufacture. Even final packaging for shipment must meet rigid specifications.

This may be producing valves the "hard way" . . . but for Lunkenheimer it's the *right* way, since it safeguards a reputation for quality that is our proudest possession.

TEST PRESSURES FAR EXCEED RATED PRESSURES

Every Lunkenheimer valve is given a thorough test at pressures far above its rated working pressure. Valves are tested on both sides at high and low pressure for seat tightness, and then given a shell test. The slightest leak causes rejection.

Today, with greatly stepped up production schedules, maintenance men appreciate more than ever the rugged durability, efficiency, and longer service life of Lunkenheimer Valves —the less attention and fewer repairs they require.

Lunkenheimer Distributors are located in all important industrial centers. There is one near you, ready at all times to assist in solving your problems of maintenance and operation.

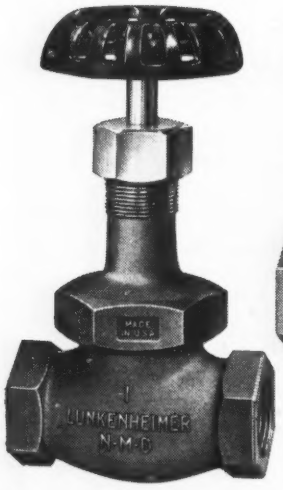


Fig. 123
"N-M-D" Globe
(Non-Metallic Disc)

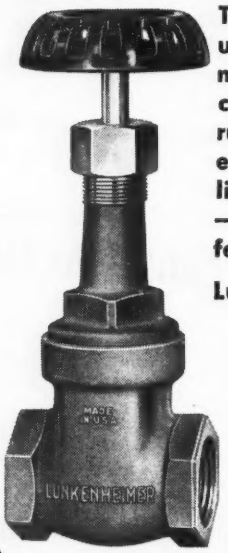


Fig. 2125
125 lb. S. P. Bronze Gate
Double Disc, Rising Stem

BRONZE, IRON, STEEL AND CORROSION RESISTANT ALLOY VALVES, 125 TO 2500 LB. S.P.; BOILER MOUNTINGS, LUBRICATING DEVICES, AIRCRAFT FITTINGS

ESTABLISHED 1862
THE LUNKENHEIMER CO.
"QUALITY"
CINCINNATI 14, OHIO. U. S. A.
NEW YORK 13 CHICAGO 6
BOSTON 10 PHILADELPHIA 7
EXPORT DEPT. 318-322 HUDSON ST., NEW YORK 13, N. Y.

rose 11 percent against an average increase of only 1 percent for American industry as a whole.

These figures, revealed in a report to the food industry by the National Safety Council, are especially significant in the light of their further statement that "since 1930, net changes in injury rates were an increase of 20 percent in frequency and a decrease of 19 percent in severity. The Food industry is one of several major industries which has not reduced frequency during the past 13 years. The net improvement in the severity rate was less than one-half of the average reduction by all industries.

The average 1943 frequency rate was 21.70, which was 51 percent higher than the average rate for all industries. The average severity rate of 1.16, however, was slightly lower than the average rate of 1.20 for all industry.

Old Nutrition Books Sought for So. Africa

DR. PETER ALLEN, secretary of public health for the Union of South Africa, is making an appeal for books, journals and other reading material dealing with nutrition, dietetics and allied subjects. This material will be used toward the building of a central nutrition library in Pretoria, Union of South Africa. Any old book, journal or article dealing with the subject may be sent to the secretary of the National Nutrition Council, P. O. Box 386, Pretoria, or to Dr. H. O. Hofmeyr, Office of Government Supply Mission, 907 Fifteenth St., N.W. Washington, D. C.

Advances in OPA

JACOB A. EMERY, of Gilford, Conn., has been appointed head of the Office of Price Administration's Grocery Specialties Section, Geoffrey Baker, director of the Food Price Division, announced recently.

SCHEDULE OF EVENTS

FEBRUARY

7—National Pickle Packers Association, board of directors meeting in lieu of cancelled annual meeting, Hotel La Salle, Chicago.

19-20—University of California, division of food technology, food processors conference, Agricultural Hall, Berkeley, Calif.

Officially Cancelled

4-6—Food Processors Conference, Chicago.

5-6—Institute of American Poultry Industries, Kansas City, Mo.

7—Canning Machinery and Supplies Association, Chicago.

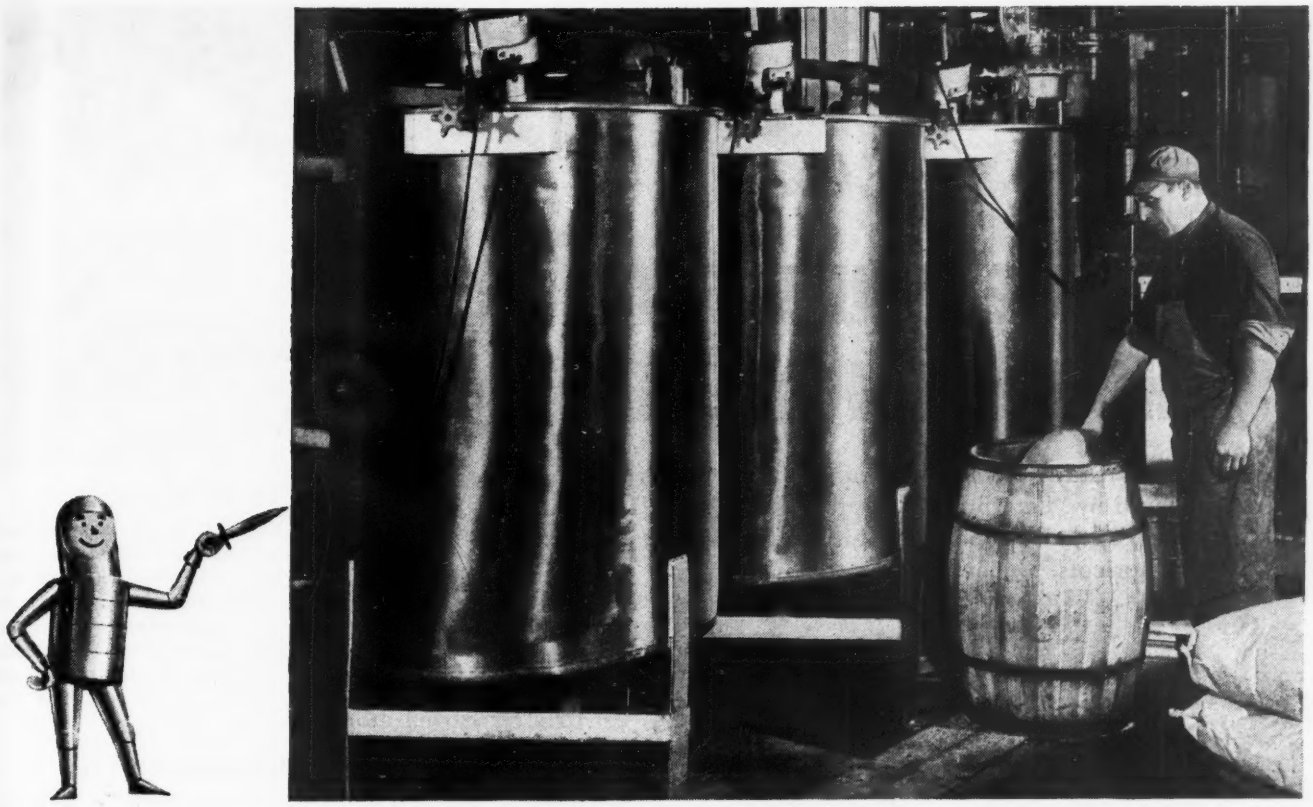
MARCH

5-8—American Society of Bakery Engineers, 22nd annual meeting, Edgewater Beach Hotel, Chicago.

14-15—Illinois Dairy Manufacturers Conference, University of Illinois, Urbana.

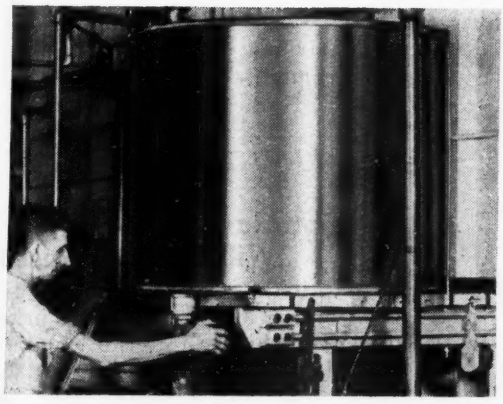
Officially Cancelled

5-8—National Food Brokers Association, Chicago.

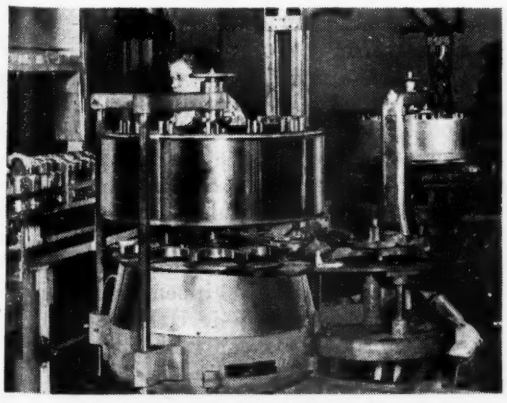


The Min-ot Food Packers, Inc., of Bridgeton, N. J., use Stainless Steel all along the line. These are holding and blending tanks.

Stainless Guards your Perishable Profits



Here you see a holding tank and pulpers of Stainless Steel for food straining.



This view shows Stainless filling machines for strained food.

THE GOOD FLAVOR and attractive natural color of your foodstuffs are your biggest assets — and a quick source of loss if anything goes wrong. ARMCO Stainless Steel equipment helps protect your products against off-taste, odor and poor color.

STAINLESS SAVES LONG HOURS of cleaning labor too. Food-acid stains are easily removed. The smooth, dense Stainless surface won't harbor bacteria and is not affected by sterilizers.

YOU SAVE ON SPOILAGE and maintenance costs. Since ARMCO Stainless is solid metal, there is no plating to wear off. This strong, bright, rustless steel is highly resistant to corrosion and abrasion.

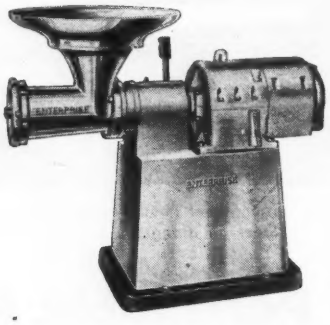
ALWAYS LOOKS GOOD, TOO — creates favorable word-of-mouth advertising among visitors. Progressive plants are making Stainless a "must" in their plans — now if they have a high priority — certainly for their post-war improvements. Write for our free booklet on how to get long, efficient service from Stainless Steel equipment. The American Rolling Mill Company, 261 Curtis Street, Middletown, Ohio.

MADE OF ARMCO STAINLESS STEEL

HELP FINISH THE FIGHT—WITH WAR BONDS

HAVE YOU A FOOD CHOPPING PROBLEM?

Today, many different types of food are being successfully reduced by "Enterprise" Choppers—nuts, carrots, spinach, meats, etc.; also foods with high sugar content like dried figs, apricots, prunes.



Whether it's for dehydrating or regular processing, "Enterprise" Choppers offer the kind of fast, low-cost cutting demanded today.

These are some of the features of the new "Enterprise" Master Series Chopping Machines:

- *Adaptability to fast production lines*
- *Dependability for nearly every type of food*
- *Razor sharp cutting action that retains juices*
- *Fully automatic operation—saves manpower*

If you will let us know your specific problem—type of food, size of cut required, capacity expected—we shall gladly send you full specifications of models suggested for your use. Address Dept. 403.

ENTERPRISE MFG. CO. of PA.

3rd & DAUPHIN STS. PHILA., PA., U. S. A.

RED CROSS DONORS

While the 1945 Red Cross drive for funds gathers momentum, the work of the organization's blood bank units continues at a stepped up pace. Here a Red Cross nurse is going over the lists of Loose-Wiles Biscuit Co. volunteers, whose response exceeded the 200-pint maximum capacity of the mobile unit that recently visited the New York "Sunshine" plant.

GMA Information Post Goes to Jean Carroll

JEAN F. CARROLL, former director of the food price division of OPA, has been appointed managing director of the Public Information Council of the Grocery Manufacturers of America, Inc., it was recently announced by Stuart Peabody, director of advertising of The Borden Company and chairman of the council's operating committee.

RAW MATERIALS

Price on Raw Coffee Will Not Be Raised

THE United States has made its decision in regard to the future price of coffee imported into this country. No price increase will be permitted. What that will actually mean in terms of coffee shipped to this market is as yet not clear, but Washington observers note a confident attitude in government officials.

The Brazilian situation is the most important. An agreement was signed last July and reaffirmed last September by the Brazilian finance minister that after certain U. S. Army requirements had been satisfied, Brazil would deliver 1,000,000 bags of coffee for the last four months of 1944. All of this amount has not been shipped, but there is no reason to believe that Brazil will not keep its contract. Beyond that, there is no agreement.

The seasonal movement toward the markets in the U. S. is now begin-

GAIR BY AIR

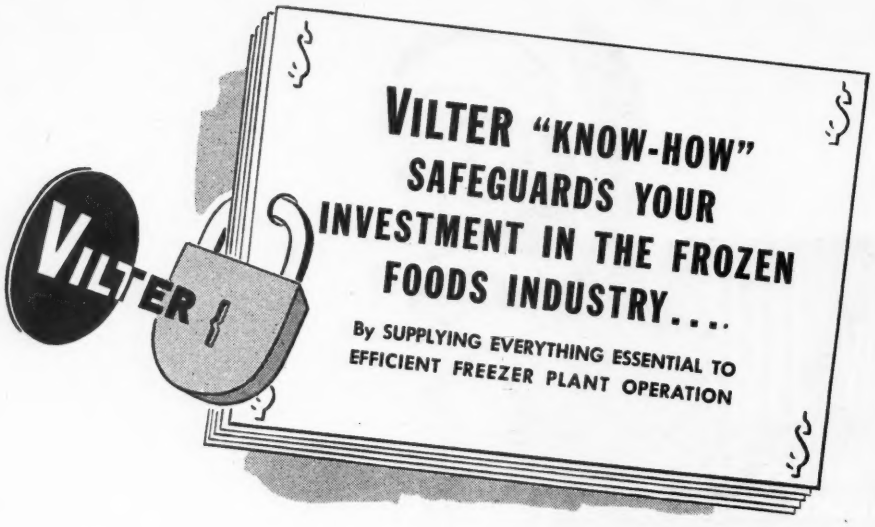
SAVES WEIGHT—SAVES SPACE
SAVES PACKAGING COSTS

To the land of the Totem Poles — flying time's from dawn to dusk. Because weight is a first consideration Gair containers and corrugated boxes play a vital part in overland and overseas shipping now and for the future. Gair by Air means maximum cargo at minimum tonnage. Write for booklet "Air Cargoes."

For large users—booklet on the Palletized Load, illustrated with official photographs.

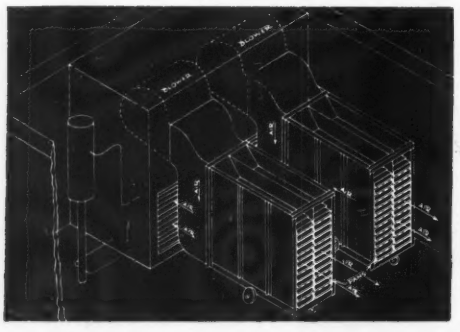
SAVE WASTE PAPER FOR WAR PRODUCTION

ROBERT GAIR COMPANY, INC., NEW YORK • GAIR COMPANY CANADA LIMITED, TORONTO
Folding Cartons • Box Boards • Fibre and Corrugated Shipping Containers

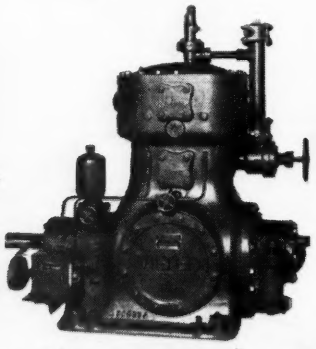

VILTER
VILTER "KNOW-HOW" SAFEGUARDS YOUR INVESTMENT IN THE FROZEN FOODS INDUSTRY....
By SUPPLYING EVERYTHING ESSENTIAL TO EFFICIENT FREEZER PLANT OPERATION

When building new freezer facilities, or converting present cold storage to freezer operation, let the "know-how" of Vilter give you sincere and dependable help.

Vilter's long and far-reaching experience safeguards your investment in the giant frozen food industry — just as it has for hundreds of others. Vilter is one of the few manufacturers in America able to supply COMPLETE plant layouts, with the equipment to operate them. Everything you need for efficient freezer plant operation — compressors, condensers, piping, valves and fittings, unit coolers, blast freezers. All these — PLUS the priceless ingredient of pioneering knowledge and experience.



FRIGID BLAST FREEZERS
Cut freezer handling labor in half. Fast, efficient, custom-built to your needs.



VILTER COMPRESSORS
in all sizes and for all refrigerants—famous for high capacity at low operating costs.

Superior Since 1867 VILTER Air Conditioning Refrigeration..

THE VILTER MANUFACTURING CO.

2115 SOUTH FIRST STREET MILWAUKEE 7, WISCONSIN

ARMY (E) NAVY

VILTER BRANCH OFFICES AND DISTRIBUTORS ARE READY TO HELP YOU

ning for the coffee-producing countries of Central America. While it cannot be foretold what the Central American coffee countries are going to do, it is certain that they will not withhold coffee from the market with the hope of getting a higher price.

Shortage Foreseen in Late Crop of Potatoes

A POSSIBLE shortage of commercial supplies of late crop potatoes is predicted by the Department of Agriculture. The prediction is based upon the fact that the 1944 crop of potatoes in the 18 surplus late states is 17 percent below that of 1943. Carlot shipments, on the other hand, have been nearly as great as in 1943 and much larger than in 1942, when supplies ran short the following spring.

This situation indicates that probably more than half of the late crop has already moved to market. On top of this, non civilian requirements, which will have to be met mainly from the late crop, are larger than in the past two seasons. It is certain, therefore, that the late crop supply to civilians will be smaller than usual.

Australian Drought Hits Cereal Grains

THE United States will have to increase its shipments of foodstuffs, particularly grain and cereal products, to its armed forces in the Pacific, according to recent advices from Australia. This year's severe drought in Australia will have a pronounced effect on the supplies of food turned over to the American forces under reverse Lend-Lease.

Acting Prime Minister Francis E. Forde, of Australia, estimates that food valued at $128,000,000 was supplied the Pacific forces in 1944. With the drought most severe in the grain producing areas, the 1945 supply will be around $112,000,000, consisting largely of processed fruits and vegetables.

Final Crop Goals

FINAL agricultural production goals for 1945, as recently announced by WFA, include an increase over the preliminary goal in the vegetable pack for processing and an upping of 10 percent in the egg goal.

These final goals, which represent the total of state goals recommended by farmers, farm leaders, and state agricultural leaders, call for continued full production.

PLASMA TO THE RESCUE...
Mr. Cellophane protecting the needle!

THE NEEDLES which transmit blood plasma to our Armed Forces *must be kept sterile.* And that's Sylvania cellophane's job! The needles are first sealed in cellophane then sterilized at terrific heat. The cellophane stays air-tight and bacteria resistant. The needles stay sterile!

One more essential war job for Sylvania! One more "command performance" for cellophane. But bear in mind that the developments Sylvania is making today will mean more uses for cellophane . . . and better cellophane . . . in the postwar tomorrow.

SYLVANIA CELLOPHANE

Made only by SYLVANIA INDUSTRIAL Corporation

Manufacturers of cellophane and other cellulose products since 1929

General Sales Office: 122 E. 42nd St., New York 17, N. Y. ★ *Plant and Principal Office:* Fredericksburg, Va.

SYLVANIA CELLOPHANE ARMY E NAVY

•Reg. Trade Mark

It's a
NEW
SCIENCE
Optonics
THE FUNCTION OF
COLOR
IN INDUSTRIAL
PAINTING

SEND FOR THIS Booklet

The Optonic Color System is based on the newly developed science of using color FUNCTIONALLY in industrial painting — to improve production, safety conditions, and employee morale. It is fully described in a new book — "Color Power for Industry." A note on your business letterhead will bring you a copy with our compliments.

THE ARCO COMPANY
CLEVELAND, OHIO • LOS ANGELES, CALIF.

ARCO
Paints for Industry

INDICATORS

Production

Meat production in Federally inspected plants during December was 7 percent less than in the corresponding month a year earlier, according to an estimate by American Meat Institute. The output was, however, 7 percent above that for November. Pork production was 12 percent more in December than in November; beef was 7 percent higher, veal was 17 percent lower; lamb remained the same; lard was up 23 percent. Of every 10 lb. of meat produced under Federal inspection, more than 4 lb. is taken by the government.

Fruit canned in California in 1944 totaled 29,415,696 cases, compared with 20,619,891 in 1943 and 26,251,688 in 1942.

The vegetable pack in California last year amounted to 28,802,729 cases, as against 24,284,018 in 1943 and 22,983,428 in 1942.

Flour production in December was 14,594,401 sacks (73 percent of total U. S. output), *The Northwestern Miller* reports. This is a decrease from the 15,870,750-sack-production in December, 1943, and a slight drop from the previous month's total of 15,000,457 sacks.

Frozen foods produced in 1944 approximated 600,000,000 lb., according to Donald Barr, of Birds Eye-Snider, Inc. Vegetables frozen totaled 183,447,000 lb.; fruits, 290,000,000 lb. Total frozen food production in 1943 was put at 450,000,000 lb.

Tomato juice packed in 1944 totaled 30,809,202 cases (basis 24/2's), compared with 22,848,901 cases in 1943, National Canners Association reports.

The California sardine pack last season was 2,518,929 cases, against 3,043,986 in 1943.

In Storage

Cold storage holdings in public and private warehouses declined 6 percent (some 250,000,000 lb.) in both coolers and freezers during December. Except for nuts, nutmeats, pork and pork products, all cooler commodities showed an out-of-storage movement. Cooler holdings stood at 2.68 billion pounds; freezer holdings, at 1.38 billion.

Meat in cold storage on January 1 amounted to 581,721,000 lb., far below the 911,574,000 lb. figure a year ago and lower than the five-year average of 776,456,000 lb.

Lard in storage on January 1 amounted to 93,167,000 lb., far below the 147,334,000 lb. holdings on January 1, 1944, and little more than half the 179,162,000 lb. five-year average.

Creamery butter in cold storage had dropped to 60,529,000 lb., little more than one-third the 154,577,000-lb. figure of a year earlier and less than the five-year average of 78,190,000 lb.

Eggs (shell, frozen and dried) in storage totaled 15,572,000 cases on January 1, almost twice the 7,986,000-case holdings of a year ago and more than five times the 2,803,000-case five-year average.

Frozen poultry in storage amounted to 268,214,000 lb. on January 1, up from the 226,161,000-lb. holdings a year earlier and the five-year average of 201,701,000 lb.

Raw Materials

Sugar distributed for consumption in the continental United States during the first 11 months of 1944 totaled 6,558,202 short tons (raw value), more than half a million tons more than the 5,909,318-ton figure for the same period of 1943. The sugar yield in Louisiana last year was put at 335,000 tons by American Sugar Cane League, down 96,000 tons from 1943.

Truck crops for commercial processing (11 of them) reached a total production of 5,419,600 tons in 1944, 7 percent below the record of 1942—but 7 percent above 1943 and 46 percent over the ten-year average. Commercial truck crops produced for the fresh

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CONSTRUCTION NEWS

	Pending (thousands)	Awarded January (thousands)	Total Awarded 1944 (thousands)
Bakery	....	....	$ 469
Beverages	$1,150	....	260
Canning and Preserving	500	$ 244	405
Cold Storage	370	240	2,160
Confectionery	40	....	90
Grain Mill Products	590	150	1,850
Ice Manufactured	40	98	140
Meats and Meat Products	50	40	1,609
Milk Products	40	140	2,838
Miscellaneous	580	488	3,369
*Complete 1944 total	$3,360	$1,400	$13,198*

market (25 of them) totaled 7,859,400 tons last year, exceeding the 1942 record by 12 percent, the 1943 output by 17, and the ten-year average by 23 percent.

Hog production in 1944 dropped sharply from the all-time 1943 peak, and a continuation of the decline is in prospect in 1945, but at a lower rate. The fall pig crop of 1944 was down 34 percent from the fall of 1943, and the spring crop was off 25 percent, giving an overall drop of 29 percent. The indicated number of sows to farrow this spring is 7 percent below the number in the spring of 1944.

Milk production for December, 1944 - March, 1945, is expected to continue at a record rate. A tentative 1945 milk production goal of 120,000,000,000 lb. has been suggested by WFA. Favoring attainment of the goal are the expected further increase in the number of milk cows and larger feed grain supply per animal unit.

Crop production in 1944 about equaled the all-time record of 1942, being 6 percent above 1943 production and 124 percent of the 1923-32, or predrought, average. Corn production amounted to 3,228,361,000 bu., compared with 3,034,354,000 bu. in 1943. Wheat production totaled 1,078,647,000 bu. against 841,023,000 bu. last year.

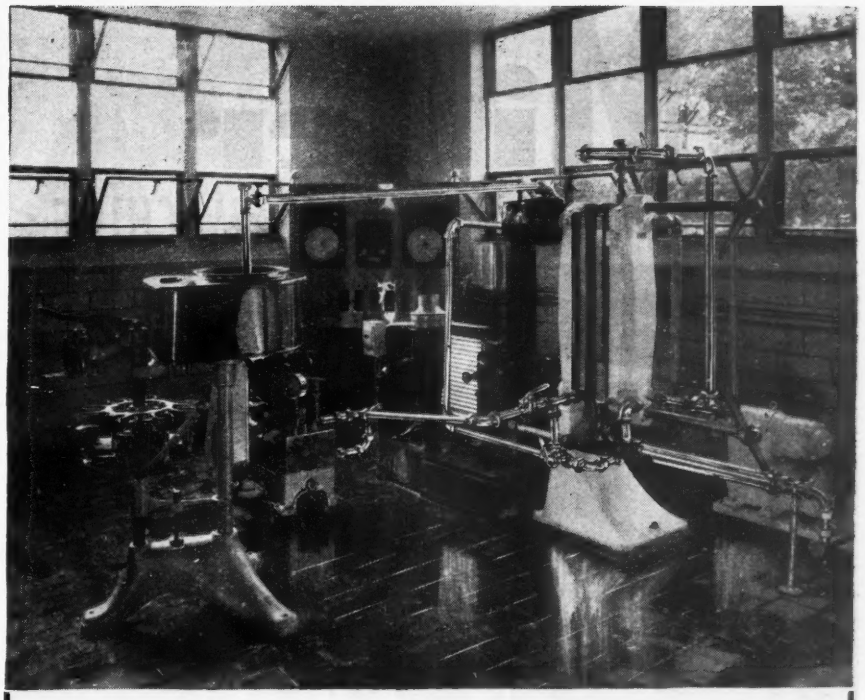
Ginger in amounts equivalent to a normal prewar supply is forecast for 1945 by WFA.

Indexes

Business activity index of *Business Week* was 230.1 on January 13, up slightly from the 230.8 figure of a month earlier but well below the 238.3 level of a year ago.

Cost of living index of National Industrial Conference Board rose to 105.6 in December, compared to 105.2 a month earlier. The figure was 103.9 a year ago.

Wholesale price index for foods, compiled by Irving Fisher, stood at 122.9 on January 19, compared with 123.7 a month earlier and 121.8 a year ago.



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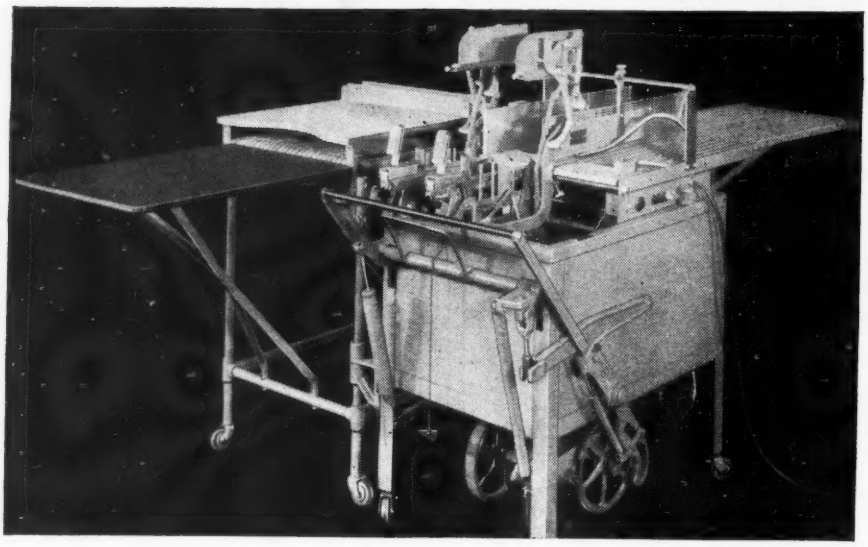

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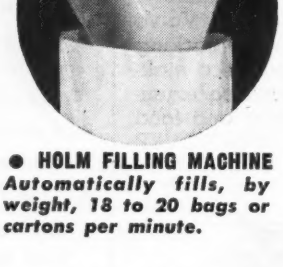

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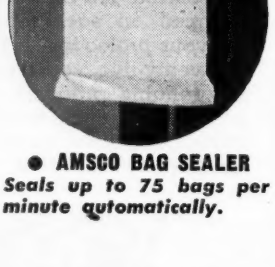

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WFA Orders

Lard — Meat packers operating under Federal inspection are required to set aside lard at the rate of 7½ lb. for each 100 lb. of live weight of each week's slaughter of hogs. This amounts to an average of approximately 60 percent of the Federally inspected lard production. The action is included in Amendment 6 to WFO 75.3, effective January 21.

Dry Milk — The February and March set-aside for spray-process nonfat dry milk solids is increased to 50 percent from the 40 percent in effect since November 1, according to a WFA announcement issued January 15.

Pork — Amendment 5 to WFO 75.3 increases the set-aside of Federally inspected pork loins from 3½ to 4½ percent of each week's slaughter in order to meet military requirements. The action was effective January 21.

Peanuts — WFO 89 authorizing quota restrictions on peanuts and peanut butter is terminated. The order, which superseded FDO 78, had never been put into operation and is now considered unnecessary.

Orders requiring shellers to set aside 50 percent of their remaining stocks of 1944 crop Spanish-type peanuts and 30 percent of Runner type for the manufacture of salted peanuts and peanut butter were issued January 2.

Spices — Quota restrictions on ginger and mace have been withdrawn and the quota for cinnamon has been reduced from 35 to 25 percent by an amendment to WFO 19.2, effective January 1.

Butter—Government agencies will take 20 percent of the butter produced in February and 25 percent in March. In announcing these set-aside requirements, WFO explains that nonset-aside butter delivered during January may be credited against February and March obligations.

OPA Orders

Processed Foods — The reporting periods that processors and wholesalers of canned and bottled fruits, vegetables and juices will use during 1945 are given in Amendment 69 to RRO 13, Amendment 31 to RRO 16 and Amendment 40 to 2nd Rev. Supp. 1, all effective December 30. The amendments also set the inventory factor at 4, for the period ending March 3.

Live Cattle — The directive ordering OPA and WFA to establish a ceiling of $18 per hundredweight on live cattle and calves, until July 2 when the ceiling is to be reduced to $17.50, was issued under Office of Economic Stabilization Directive 28, effective January 29.

Container Limits — Limitations on the maximum sizes of wooden or fiber containers that may be used for packing house shipments of meat byproducts are removed by Amendment 6 to MPR 398, effective January 1. This brings the OPA provision into conformity with WPB's L317.

Adjustable Pricing — Upward adjustment of processors' ceiling prices, to cover the sales and deliveries of packed fruits, vegetables and berries during the period August 4 to September 20, is provided by Order 65 to MPR 306. These sales had been made as the result of an erroneous report, which indicated sales after August 4 were permitted under the adjustable pricing plan. Actually, these sales were not legal until September 20.

Frozen Berries — Flat prices for most frozen berries in large-size containers are about one-half cent a pound less than a year ago under Amendment 3 to Supp. 6 to FPR 1. The amendment also provides formulas to be used by processors in pricing frozen fruits, vegetables and berries in small containers.

Dried Apples — Processors' ceiling prices for civilian sales of dried apples of the 1944 crop will be 33 cents a pound, regardless of grade, according to Supp. 10 to FPR 1, effective December 26. The 4 per cent allowance for wage rate increases, which was permitted for the 1943 pack, may be added to this price in specified states.

Beef — Ceiling prices for Utility grade boneless beef used in the production of canned meats for the Army are provided in Amendment 49 to RMPR 169, effective December 29. On a hundredweight basis they are: New York City, $22.75; Chicago, $21.75; San Francisco, $23.00.

WPB Orders

Tin — Reduction to .50 in tin for can ends for the civilian pack of peaches and changes in the packing quotas for some other canned fruits and vegetables are included in the changes in M-81, issued January 1. Can material specifications for corn and peas are also changed from bonderized ends to .50 electrolytic ends. In each case the order specifies the minimum size can that may be used.

Vitamin C — Allocation controls for ascorbic acid are removed by the revocation of M-300. This action is permitted by the improvement in supplies since the order was first issued.

Boxboard — The maximum weight of boxboard permitted for packing lard and shortening in 3- and 4-lb. cartons is increased from 77 to 82 lb. by an amendment to L-239, issued December 18.

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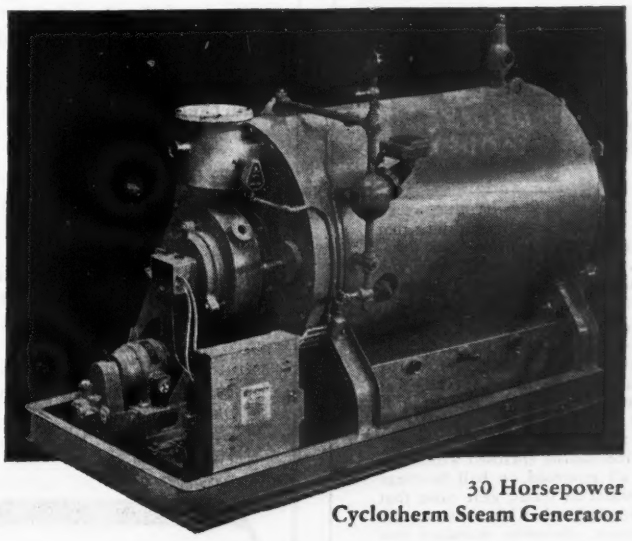

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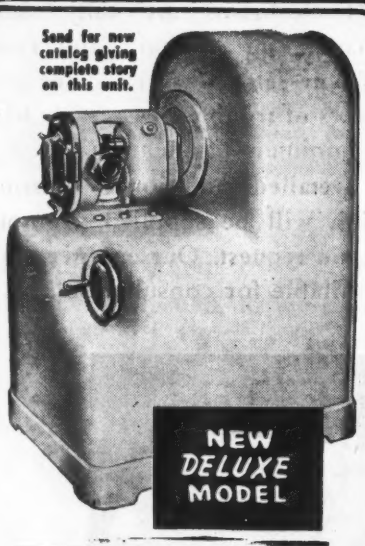

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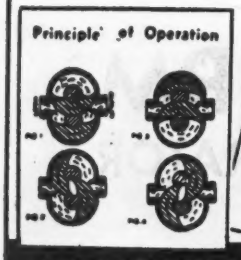

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CAPITAL VIEWS

INSTITUTIONAL PACKAGES — Uncle Sam is selling a lot of second-hand containers, the war need for which has passed. Some of these may make good containers for food for institutional use where beauty need not be a factor. For example, the Navy has been selling 7.5-gal. tanks which were intended for fuel use. These might be used for some liquid foods if care is taken to be sure that the soldered seams do not introduce metal contamination. Scarcity of containers suggests such use of surplus items when at all possible.

FOOD CZAR? — The wrangling between OPA and War Food Administration has again stirred Congressional demand for a single czar over all food activities. The fact that this is a Republican drive indicates that it is not likely to succeed, despite merit.

CUDAHY SEIZURE — The Army did not want to take over Cudahy facilities, but they are literally "good soldiers" and take orders. This kind of action can be expected in increasing numbers from the present labor-influenced government. Even National War Labor Board is forced to go further than its membership wishes. In this case the issue to be enforced was the check-off on wages. But it might just as well have been any one of a dozen other things. The labor policy of food establishments must take account of these problems. The executives must take orders from Uncle Sam's civilian agencies, or they find themselves taking military orders instead.

A SPECIAL HALO — Increased rigidity of inspection should be expected at baby-food plants. Some of the more recent activities of the Food and Drug Administration are based upon philosophy that there is nothing too good for the infant and that extremes of care must be taken to prevent contamination. Thus this is the industry in which management will first feel the tghtened grip of official inspections seeking to prevent contamination of foods by insect fragments and other pests.

PRICE TAGS NEEDED — OPA shows an increasing tendency to demand that ceiling prices be indicated on every item. It recently required that retail ceilings be shown on every fountain pen and mechanical pencil. It is only a few steps further to the point where each dealer will have to have the ceiling price marked on every package of everything. It may be well for the food industries to leave a suitable space for price marking at the store whenever they redesign packages or package labels.

TAKE-HOME WAGE — The unions are going to insist that the take-home wage not be reduced, whenever they can achieve that objective. This is one of the major arguments that will be used when postwar wage contracts develop. Any immediate increases forced by labor scarcity may aggravate the problem of postwar wage agreements, especially in cases where overtime is now paid at a generous rate. The postwar take-home wages will thus be cut more, in proportion, than the reduced time worked.

DOMESTIC SUGAR — It appears that for at least a couple of years, possibly longer unless the Jap war ends as soon as we hope, there will be urgent need for more domestic sweeteners. Certainly V-E day will bring little relief in new sugar supplies. In fact, it may increase the demand on insular supplies and thus intensify U.S. scarcity. Some folks about Washington think sugar users ought to campaign vigorously for greater domestic production. This might mean a campaign either to support a greater beet sugar crop or to develop greater corn sweetener capacity. There appears little that can be done to increase do-

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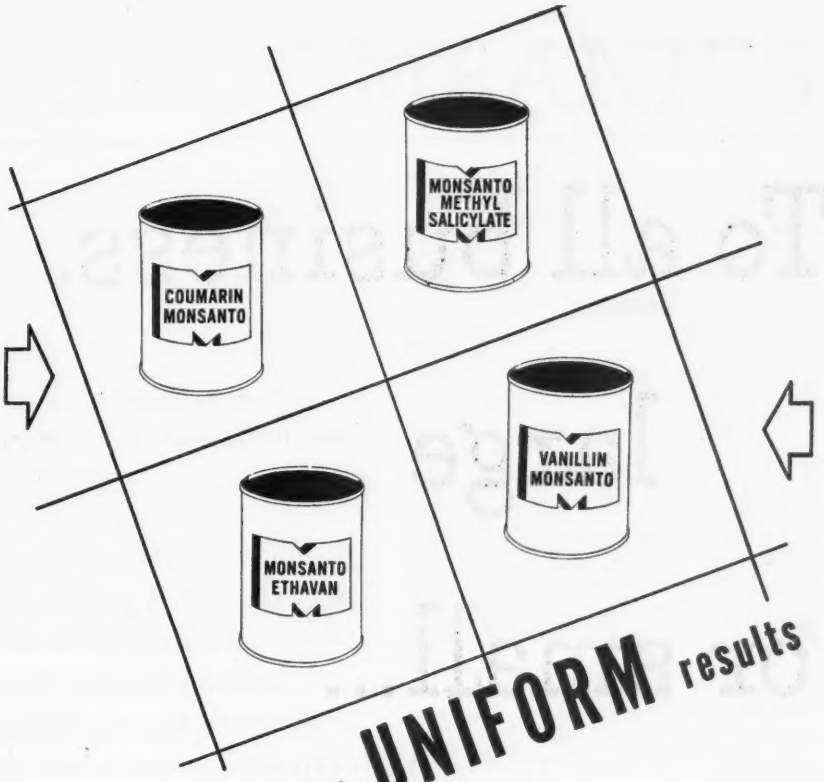
mestic cane sweetener supplies, according to these observers.

UNRRA CONFUSION — Even early in January there was talk that UNRRA might soon begin to dispatch relief supplies. The fact appears to be that UNRRA is merely causing confusion. It has not found its place as a means for moving food, and it is one of the major agencies blamed for creating certain food scarcities. It apparently buys in the expectation of using, but becomes merely a hoarder. Some folks think that domestic producers ought not to sell foods to UNRRA when they can avoid it. But that is a pretty drastic step for a food producer to take alone.

STAINLESS AVAILABLE — Huge quantities of alloying metals will be available for making stainless steel and other special alloys for postwar use in food equipment. It is still too early to get everything of this sort that is wanted; but there is nothing to prevent wishful thinking and some actual equipment planning. When the ultimate European victory comes, it will be rather too late to start such special equipment plans. Right now, small supplies of most special metals are obtainable to permit practical plant tests to be sure of performance in the factory. Equipment builders will welcome specific inquiries of this sort, even though not all of them can be filled immediately.

POSTWAR FUELS — Extensive development of oil pipe-lines and natural gas transmission lines make certain that after the war there will be much greater availability of fluid sources of energy. Obviously, the supply of electricity will be greater than it ever was before the war. Postwar planning for the food plant should, therefore, take account of these changing conditions. It may be that in some cases the type of equipment chosen for future expansion or modernizing may be different if gas, oil or electrical heating is contemplated instead of coal. Right now this is a question worthy of thoughtful review by every food technologist.

VETERANS' TRAINING — American Bottlers of Carbonated Beverages has started an interesting program of training men, especially returning servicemen, to qualify them as skilled technicians in carbonated beverage plants. Starting at the end of January, there will be short-courses, of three weeks each, given at strategically located technical schools. Other food manufacturing groups who want to get skilled personnel may wish to imitate this unusual program of industrial training.



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Today in wartime, the lack of new civilian trucks has thrown a revealing light on the performance and stamina of every make of truck in the United States. Right now is the time to dig into all the facts as they exist—to find out which trucks are standing up best under the toughest conditions trucks have ever had to face.

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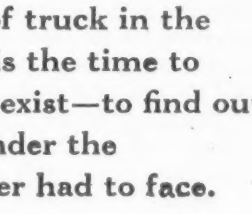
They will tell you—in no uncertain terms—that the man who owns a Mack is lucky, and the man who plans to get one is wise.

Essential civilian users can now secure Mack trucks. Ask your nearest Mack branch or dealer for details.



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INDUSTRY

American Bakers Association has moved its Chicago headquarters from 1135 Fullerton Ave., to 105 West Adams St. American Bakers Foundation has also moved to the same address, while American Institute of Baking retains its offices, departments, laboratories and school at 1135 Fullerton Ave.

Chase Candy Co., St. Joseph, Mo., has been purchased by F. S. Yantis & Co., Chicago, investment securities brokers. Arthur S. Dewing, Boston, becomes the chairman of the board, and F. S. Yantis, treasurer.

Chicago Beverage Co. has purchased a new bottling plant in Chicago, in which a subsidiary, the Orange-Crush Bottling Co. of Chicago, Inc., will operate.

Citrus Products Co. has been organized in Plant City, Fla., to operate a citrus juice plant. The new company is a division of Russell Black & Co.

Clapp's Baby Food Co. has taken over the lease of the old U. S. Products Co. plant in San Jose, Calif., from Schukl & Co., where they will operate until their new plant is built.

Craddock Canning & Preserve Co. has succeeded the Nagle Packing Co. of Paducah, Ky. The company's operations will include the canning of fruits and vegetables, manufacture of preserves and the cold packing and freezing of strawberries and peaches. B. Frank Craddock is general manager in charge of all operations.

The Flavour Candy Co., Chicago, has bought a two-story factory building from the National Die Casting Co., which they will remodel as a modern candy kitchen for occupancy next May.

Irvington Fish & Oyster Co., Irvington, Va., lost two-thirds of the plant's buildings and equipment through a $100,000 fire December 31. Other fires reported include: The Polk Co., citrus canners of Tampa, Fla., a $150,000 warehouse fire, which destroyed thousands of cases of citrus fruit, January 1; the Jefferson Packing Co., Beaumont, Tex., a $100,000 loss on December 29.

Walter H. Johnson Candy Co., Chicago, now owns the Bishop & Co., candy factory in Los Angeles, Calif. Production will continue under the Bishop & Co. name, but the management has been taken over by the Johnson company.

EVERETT E. HASKELL

The Middle West was fully represented among the 1945 officers of the American Butter Institute when Everett E. Haskell, Beatrice Creamery Co., Chicago, was elected president, at its recent meeting. D. K. Howe, Fairmont Creamery, Omaha, was elected vice-president and H. A. Ruehe, Chicago, remained as secretary-treasurer of the Institute.

C. EVERETT CASTO

Previously vice-president in charge of sales and advertising, C. Everett Casto has been elected president of the Ward Baking Co., succeeding R. G. Cowan, who will continue as a director and will do research work for the company. A. E. Tolley, previously a vice-president, became executive vice-president, and E. A. McLaughlin was advanced to vice-president and director.

Kuder Citrus Products Co. will operate a $250,000 plant in Bartow, Fla., which is to be built by Defense Plant Corp.

John Morrell & Co. is adding a new lard storage building to its plant at Sioux Falls, Iowa. The new unit will increase the plant's large storage capacity to 2,000,000 lb.

National Dehydrators' Association is asking members to imprint its new membership emblem upon their stationery, advertising materials, and the like.

North Star Dairy Cooperative, St. Paul, recently allocated funds for a large modern control and research laboratory. The Cooperative now operates five spray milk drying plants, and with additional facilities planned, anticipates an annual volume of 40,000,000 lb. of spray-dried milk powder. North Star recently purchased Milk Producers' Sales Agency, Chicago.

Peet Packing Co., Chesaning, Mich., has formulated a program that will guarantee steady employment throughout the year, regardless of fluctuations in production demands. The program will become effective upon the termination of the war in Europe or April 1, 1945, which ever occurs first.

Pet Milk Co., has purchased the equipment and leased the real estate of the Phelps Can Co., New Philadelphia, Ohio. Production of milk cans for Army Ordnance and Lend-Lease is planned to begin February 15.

PERSONNEL

Joseph Darsky, general manager of the Golden Age Ginger Ale Co., Youngstown, Ohio, has been named general manager of the Golden Age Pepsi-Cola Co.'s plant in Houston. Ray Thayer, with the Golden Age Co.'s Akron plant, has been named to replace Mr. Darsky in Youngstown.

Gilbert Gibson, formerly with the Dean Milk Co., Chemung, Ill., now is with Sidney Wanzer Co., Chicago.

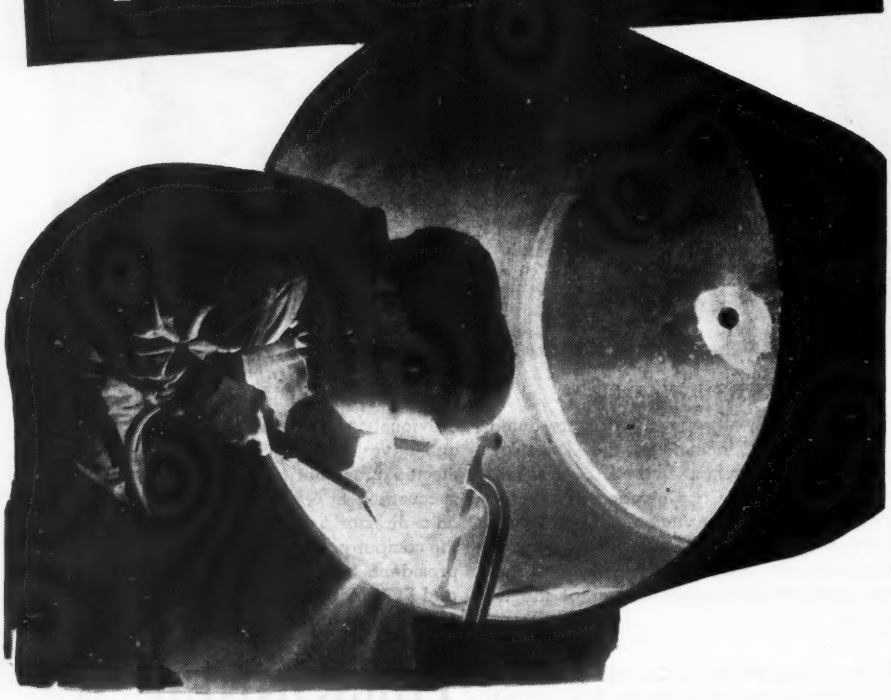
Chester K. Hayes has joined the staff of Cereal Institute as extension director, according to Andrew Duncan, managing director of the Institute. In his new capacity, Mr. Hayes will work in cooperation with the national nutrition program.

W. Emery Hobbs, of the War Food Administration, Processed Products Inspection Division, has been transferred from San Jose, Calif., to Salem, Oregon.

Roy Houston has been appointed divisional sales manager, central territory, for Stokely-Van Camp, Inc. Mr. Houston formerly was in government service in Washington, D. C.

J. C. Loftis, former assistant general manager of the Southwestern division of Kraft Cheese Co., has been named general manager of the Southwestern

Can *Extra* years of service be built into your processing equipment?



You think of stainless steel processing equipment in terms of permanence. The original sheet itself is remarkably corrosion resistant for most applications—unusually long wearing. What about the finished vessel? The vessel is the metal transformed by engineering and fabrication. Its length of life is determined by the *way* it is engineered and fabricated. You *must* depend on your fabricator to *preserve* the properties which resist corrosion by the reagents employed in your processes.

Blickman guards alloys in fabrication. Blickman engineers have equipped our plant with special machinery—set up tested manufacturing procedures—to preserve the corrosion resistant qualities of the original alloy during fabrication. We work with corrosion resistant metals exclusively. We know that retaining maximum corrosion resistance means extra years of service for your equipment.

Our knowledge of the way the sheet steel reacts to welding, bending and forming makes it possible for us to maintain, to a greater degree, the properties inherent in the alloy—and build your equipment to last longer. Consult with us.

S. Blickman, Inc., 4102 Gregory Avenue, Weehawken, N. J.

S. BLICKMAN, INC.
Guards Alloys in Fabrication

A request on your letterhead will bring our guide, "What to Look For When You Specify Stainless Steel for Your Processing Equipment."

CORROSION RESISTANT PROCESSING EQUIPMENT

TANKS • KETTLES • STILLS • HEAT EXCHANGERS • AGITATORS • MIXERS • TOWERS • PIPING

Dr. L. H. JAMES

A consulting laboratory service was recently established in Chicago by Dr. L. H. James, who has been professor of bacteriology and head of the dapartment at the University of Maryland since 1927. Work in the new laboratory will include the control of bacteria, yeast and mold in food preservation and the mocrobiology of food products.

division. He succeeds the late Arthur E. Kildeau, and will have his headquarters in Denison, Tex.

E. D. McCafferty, director, vice-president and secretary of H. J. Heinz Co., retired from active business on January 1, after 48 years of service with the company. He was succeeded as director and secretary by his son, T. B. McCafferty. R. G. Shinabarger and J. H. Letsche, both Heinz Co. directors, have been elected vice-presidents.

Richard M. Moss, associated with the Obear-Nester Glass Co., has been elected chairman of the board of the National Candy Co., St. Louis. Ray E. Clizbe, previously general manager of the company's Clinton, Iowa, corn sirup and corn starch plant, was elected president to succeed Vincent L. Price, who helped found the firm 42 years ago. Mr. Price will remain with the firm as a director. Leonard A. Huemmeler was named secretary-treasurer to succeed Ronald M. Bates, who is retiring because of illness.

Gerald Reed, formerly in the research department of Upjohn Co., Kalamazoo, Mich., has joined the research staff of Libby, McNeill & Libby, Blue Island, Ill.

R. M. Schaffner, formerly chemical engineer in charge of research with Guardite Corp., Chicago, recently joined Libby, McNeil & Libby as chemical engineer to work on processing methods.

W. C. Stewart, owner of Stewart's, Memphis food manufacturing firm, recently was elected president of the Southeastern regional section of the National Potato Chip Institute.

Complete

...as in Betner Service

Yes, sir, it's a *complete* packaging service that Betner gives—from idea to finished bag.

And available to you, all or part.

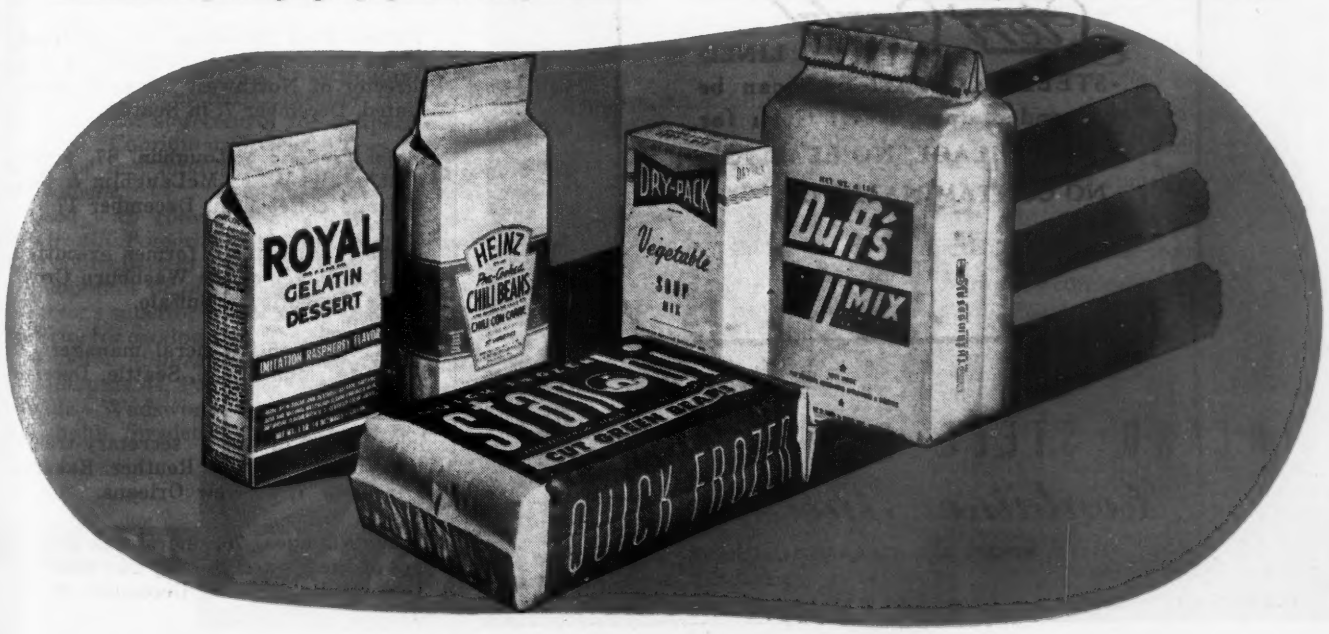
Is it frozen foods you're interested in? Or containers for retail or institutional use? Leading firms have found their answer in Betner Bags.

For frozen foods, coffee, cereals, flour mixes, powdered and dehydrated foods, etc., nothing has come along more satisfactory to progressive processors than Betner Bags. They want quick fill-and-seal, top moisture-vapor protection, a minimum of packaging equipment. They demand insurance against leakage, seepage, loss of flavor. They get 'em all with Betner Thermoseal and Lamofilm Bags.

A complete bag service is on call here. Idea men, art staff, printing presses, bag-making machinery at your command—or any part thereof. Write us about your problem, present or postwar. You'll be in no way obligated.

Benj C Betner Co

DEVON, PA.



Gus B. Ulvin has been named chief of quality control for Foremost Dairies, Inc., Jacksonville, Fla. Mr. Ulvin was chief chemist and bacteriologist for Sidney Wanzer & Sons, Chicago.

Leo N. Vining, procurement manager for Moores & Ross, Columbus, a unit of Borden Co., has been named general plant manager. He will have supervision over all of the firm's mechanical and technical departments.

L. H. Wohlwend, orange sales manager of the California Fruit Growers Exchange, has been appointed to the post of general sales manager, succeeding T. H. Powell, retired. R. B. Wallace will succeed Mr. Wohlwend as sales manager for orange juice and grapefruit.

DEATHS

Edward H. Boehm, controller and office manager of Walter Birk Candy Co., Chicago, December 17, in Chicago.

Carlos K. Eckhart, 69, treasurer of the B. A. Eckhart Milling Co., Chicago, November 26, in Chicago.

Walter J. Foley, 55, technical adviser in American Can Co.'s eastern office, recently.

Fred W. Hooper, pioneer in the creamery business in Nebraska, and who opened in Columbus, 32 years ago, the first Fairmont creamery plant in Ohio, December 12, in Columbus.

Dr. Samuel L. Jodidi, 77, biochemist for the Department of Agriculture, December 31, in Chevy Chase, Md.

Spencer Kellogg, Jr., 68, former vice-president and director of Spencer Kellogg & Sons, Inc., December 19, in Santa Barbara, Calif.

William Peck McCaffray, 64, president of the National Fruit Canning Co. and director of Northwest Canners' Associated, December 7, in Seattle.

Major Frederic McLaughlin, 67, president of the W. F. McLaughlin & Co., Chicago coffee firm, December 17.

Walter J. Nisbet, 67, former executive sales manager of the Washburn Crosby Co., recently, in Buffalo.

C. A. Pappenfus, general manager of the S. A. Moffett Co., Seattle, December 28.

John W. Schmitt, 54, secretary-treasurer of the Joseph Reuther Bakery, December 7, in New Orleans.

Louis Willinger, 76, one of the founders of the United Baking Co., now the General Baking Co., December 28, in Toledo.

FOOD PROCESSES

"Continuous Balance" is a new principle in pyrometry. It makes the Brown *ElectroniK* Potentiometer an outstanding advance in instrumentation – probably the greatest step forward in several decades.

In this advanced potentiometer controller, the "Continuous Balance" unit supplants the galvanometer used in conventional mechanical-type potentiometers employing a periodic or cyclic mechanism.

As an Air-operated Controller it provides the ideal synchronization of measurement and control for temperature processes.

What "Continuous Balance" does for measurement – "Air-o-Line Control" does for fuel modulation, being capable of infinite fineness in fuel valve adjustment.

Used with conventional wiring and thermocouple installations, Brown *ElectroniK* Potentiometers are rapidly outmoding all other forms of temperature controllers in food processing.

Thousands of operating hours have proved the Brown *ElectroniK* Potentiometer's superior performance – sensitivity – ruggedness.

Write for catalog 15-4, THE BROWN INSTRUMENT COMPANY, *a division of the Minneapolis-Honeywell Regulator Company,* Wayne Avenue, Philadelphia 44, Pa. Offices in all principal cities. 119 Peter Street, Toronto, Canada – Wadsworth Road, Perivale, Middlesex, England – Nybrokajen 7, Stockholm, Sweden.

HAVE YOU A CONTROL PROBLEM?

Co-ordination of measurement and control of temperature and other variables in the processing of foods assures uniform quality and lower costs.

Brown Instruments and Minneapolis-Honeywell Controls bear this responsibility in a constantly increasing number of plants in the food industries.

When you look for control instruments best suited to your requirements, call a Brown engineer who is qualified to recommend the correct indicating, recording or control instrument for the control of a single function or complete control of the entire process.

Write for catalogs on temperature, pressure, flow and liquid level control.

BROWN *ElectroniK* POTENTIOMETERS

LO-BAX
50% available chlorine

LO-BAX SPECIAL—a superior chlorine bactericide in granular form—packed in 2½-lb. bottles, ½ doz. to the case; and in 14-oz. bottles, 1 doz. to the case.

LO-BAX POWDER—a highly efficient chlorine bactericide packed in 28-oz. bottles, 1 doz. to the case.

THE KEY TO QUALITY CONTROL

LO-BAX, the concentrated, fast-killing chlorine bactericide, is the key to quality control in thousands of food plants . . . prevents food spoilage, improves quality standards by controlling bacteria, keeping down mold, sanitizing all surfaces with which food comes in contact.

Simple and easy to handle—Lo-Bax kills bacteria almost instantly on contact . . . and at amazingly low cost. Dissolves quickly in water—hot or cold, hard or soft—to make clear chlorine-rinse solutions. Containing 50% available chlorine, Lo-Bax maintains its strength as packed in the original container.

Make Lo-Bax the key to quality control over your products. Write for helpful information.

Mathieson
LO-BAX
CHLORINE BACTERICIDE

THE MATHIESON ALKALI WORKS (INC.) • 60 East 42nd Street, New York 17, N. Y.

Lo-Bax Super-Nufos . H T H-15 . Dry Ice . Carbonic Gas . Ammonia, Anhydrous & Aqua Caustic Soda . Soda Ash . Bicarbonate of Soda . Liquid Chlorine . Bleaching Powder PH-Plus . Synthetic Salt Cake . Sodium Chlorite Products . Sodium Methylate

ASSOCIATED INDUSTRIES

Chain Belt Co., Milwaukee, has received its fourth Army-Navy "E" Award. Goodyear Clearwater Mills, Atco, Ga., also has been awarded the Army-Navy "E" citation, the 10th for a Goodyear Tire & Rubber Co. plant or subsidiary. A like award has been given to Goulds Pumps, Inc., Seneca Falls, N. Y.

Container Corp. of America has announced plans for the construction of a new manufacturing plant in Greensboro, N. C.

Dole Refrigerating Co., Chicago, has established an employee profit-sharing plan. Each year the company will contribute 25 percent of the net profits to the fund. No contributions are made by employees.

Creamery Package Manufacturing Co. recently opened its 19th U. S. sales branch and warehouse at Nashville, Tenn. This gives the company three branches in the South, the other two being in Atlanta and Dallas.

E. I. du Pont de Nemours & Co. has opened a sales office, for its cellophane division, in Atlanta. The office was established to provide packaging service to the food industries of the South.

Food Machinery Corp. has added Dr. Earl M. Hildebrand, plant pathologist, to its research staff at Dunedin, Fla. Dr. Hildebrand has done considerable work in the study of bacteria, fungi and viruses causing diseases of deciduous fruits, during the past 12 years at Cornell University.

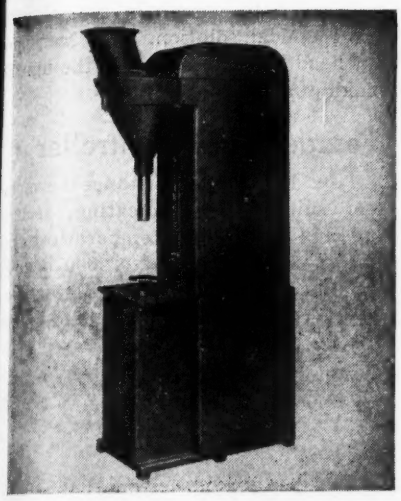
Glass Containers, Inc., will construct a new glass manufacturing plant at Antioch, Calif., to supplement production of the company's Los Angeles plant.

Wm. S. Merrell Co., Cincinnati, has appointed Dr. Milton J. Foter as chief of the company's bacteriology division. Dr. Foter was at one time chief bacteriologist and head of the division of bacteriology of the Pet Milk Co.

Owens-Illinois Glass Co. has named Dr. C. O. Ball as director of the newly created process and product research division. Dr. Ball formerly was in charge of research for Owens-Illinois Can Co., and before that was assistant director of research for American Can Co.

Worthington Pump & Machinery Corp. recently elected Clarence E. Searle as president of the corporation to succeed Harry C. Beaver, who was elected vice-chairman of the board of directors and chairman of the management committee. Mr. Searle has been vice-president in charge of sales since joining the Worthington organization in 1932.

FOOD EQUIPMENT NEWS



Packer for powders.

Auger Packer

USED for filling powedered materials in quantities from several ounces up to 5 lb. in cans, bags, cartons or jars is an improved auger packer developed by Triangle Package Machinery Co., 906 N. Spaulding Ave., Chicago. Production of 1-lb. packages is 30 or more per minute. Another new feature of this packer is an electrically controlled emergency stop switch that enables the operator instantly to cut off the feed of material from the auger and thus prevent waste if anything goes wrong.

Improved Lubricants

FREE-FLOWING, high-film-strength lubricating oils, claimed to be impervious to heat, acid and some other chemicals, have been developed by The Bonded Oil System, Inc., 108 Massachusetts Ave., Boston 15. These lubricants contain "Bonoleum," compounded with a castor oil "essence" from which the gum-forming ingredients have been removed.

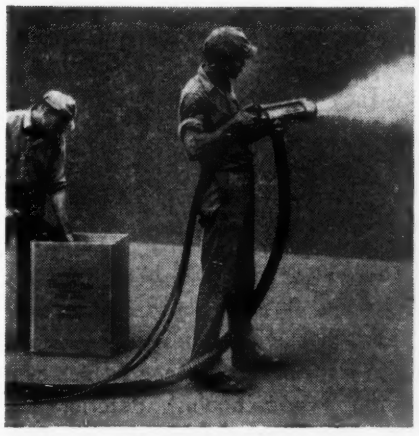
Oxygen Indicator

USING the Pyrite principle of chemical absorption, the Bacharach Industrial Instrument Co., 7000 Bennett St., Pittsburgh 8, Pa., has placed on the market a new indicator that enables rapid oxygen determination. It is a portable gas analyzer with a rated accuracy of ½ per cent.

The sample of the gas or atmosphere to be tested is pumped into the instrument with an aspirator bulb. Release of the finger pressure on the connector automatically locks the sample in the calibrated measuring chamber. The instrument is then turned bottom-side up and back again, which causes the absorbing fluid to mix with the sample and absorb the oxygen. The graduated tube is calibrated to read directly on the scale in percentage. The standard range is from 0 to 20 percent.

Syphon Spray Gun

THIS gun is said to syphon dry high-temperature insulating material direct from a shipping carton, mixing it with water to spray on refractory walls in one operation. Illinois Clay Products Co., 608 S. Dearborn St., Chicago 5, states that premixing is thus eliminated. The gun operates on standard air and water pressures. It weighs but 4 lb., and can be moved about easily.



Insulation Sprayer

Venturi Safety Valve

DEVELOPMENT of a line of Venturi-type safety valves, with special provision for constant, accurate blow-off, is announced by Farris Engineering Co., Palisades Park, N. J. The manufacturer claims unusually large capacity, complete tightness of reseating and minimum escape of vapor into surrounding space. Angular distortion and fouling are claimed to be eliminated.

Portable Conveyor

PORTABLE belt conveyors in two lengths are announced by Coaltoter Conveyor Co., 310 S. Michigan Ave., Chicago 4. The lengths are 13 ft. 9 in. and 20 ft. Either may be driven by an electric motor or a gasoline engine. And either may be had with a standard engine mounting or a high engine mounting for conveying bulky material.

Program Timer

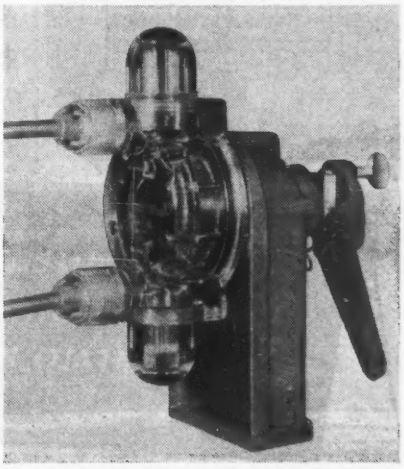
SYNCHRONOUS motored for accuracy is a new program timer manufactured by Zenith Electric Co., 152 W. Walton St., Chicago 10, Ill. This new timer is an automatic switch which can be set to close electrical circuits at any desired 5-minute intervals in a 24-hour schedule. As many as 288 operations a day are possible. The program mechanism is set automatically by turning the minute hand of an ordinary clock. The schedule is easily changed any time without the use of tools. Silver contacts operate with snap action, and the current rating is 10 amp. at 110 volts. The steel case of the timer measures 8 x 12 x 4 in.

Heat Sealer

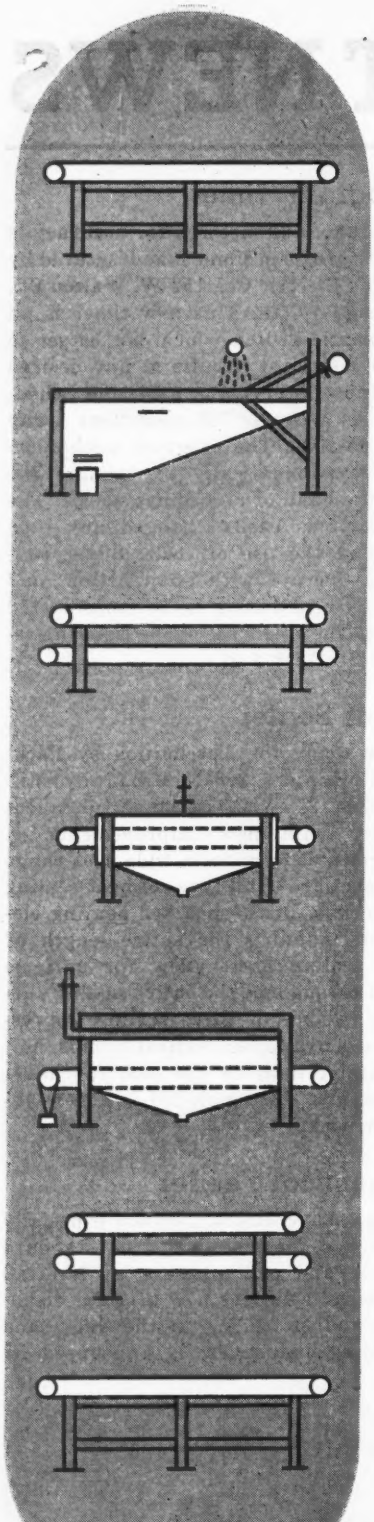
Now ready for distribution by Pack-Rite Machines, 828 N. Broadway, Milwaukee 2, Wis., is an Adjustaheat sealer with new improvements. A thermostat provides a wide heat range to take care of all types of heat-sealing materials. Brass-sheathed heating elements, running the entire length of the sealing bars, allow for uniform heat throughout the entire sealing surface. Choice of three sealing impressions is available: vertical crimps, horizontal crimps or flat seal for heavy materials. Also included is a new 12-in. model.

Chemical Feeder

A SMALL chemical feeder, especially designed for installation on standard bottle and can washers to feed all chemical solutions now used for cleaning and sterilizing in the dairy and bottling industries, is announced by



Chemical feeder with plastic head.



EVERY STEP OF THE WAY

FROM RAW MATERIALS TO CASE GOODS HANDLING

KANRY-TEX MEETS BELTING REQUIREMENTS

Yes, the rigid canneries and food processing plant conveyor belt requirements are met by Globe Kanry-Tex. These belts are easy to clean and keep clean and sanitary. They resist moisture, fruit juices, fats, acids, alkali, etc. They are long lasting. If you have not yet experienced the merits of Kanry-Tex, you will welcome the increased efficiency they bring your plant.

Here's why Globe Kanry-Tex increases efficiency. It is solid woven cotton belting, strengthened by thorough impregnation with a synthetic compound which protects the fabric against deteriorating agents. This impregnation also provides a surface easy to clean with water, live steam or sterilizing agents.

Other Kanry-Tex features include: (1) minimum stretch; (2) no slipping of pulleys; (3) adaptable to small pulleys.

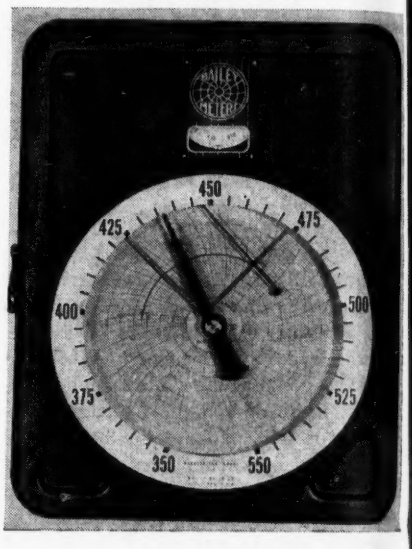
It will pay you to consult your nearest mill supply house or write us direct for full details.

GLOBE WOVEN BELTING CO.
1396-1400 CLINTON STREET
BUFFALO, N.Y.

Proportioners, Inc., 30 Codding Street, Providence, R. I. The unit comes as a complete kit, with full installation accessories furnished, including the reagent tank. A transparent plastic head permits the operator to view all the moving parts coming in contact with the chemical solution. This transparent head helps to maintain the unit at maximum efficiency.

Temperature Controller

AN electronic-type resistance thermometer suitable for indicating, recording and controlling temperatures between −100 deg. F. and 1,000 deg. F. is announced by Bailey Meter Co., 1050 Ivanhoe Road, Cleveland, Ohio.



Electronic controller

Reliable performance and accurate calibration over long periods of continuous operation are said to result from its sturdy design. A 29-in. indicating scale which circles the chart may be read easily at a distance of 50 ft. Indicating, recording and controlling mechanism are all driven by the same reversible electric motor, which adjusts the slidewire resistance to balance the measuring bridge.

Dehumidifier

ANNOUNCED by the General Air Conditioning Co., Oakley, Cincinnati, Ohio, is a new dehumndifier.

It consists of a three-stage terraced receptacle to which is fed cubed dehumidifying agents. These cubes are deliquescent. The liquid is caught in a bottom receptacle, after the cubes have dissolved in the absorbed moisture. The cubes are 1½x2 in. in size. It is said that they do not fuse together, thus permitting a more effective circulation of air through the cubes until they are entirely dissolved.

A single unit will service from 800 to 1,000 cu. ft. of space.

CATALOGS, BULLETINS

FOOD PLANT EQUIPMENT

Continuous Centrifuge—Describing the continuous separation of suspended solids by centrifuging is an 8-page bulletin issued by Merco Centrifugal Co., Hobart Building, San Francisco, Calif. This centrifuge separates solids from slurries. As the solids are concentrated in the rotor, they are washed countercurrently and carried out of the machine with fresh liquor. Due to the high gravity effects, it is said that separation is rapid and thorough.

The centrifugals have several food plant applications, such as the recovery of beet juice from pulp. They also may be employed to separate two solids having different settling characteristics, as in the starch-gluten separation in the wet starch process.

General Equipment—An 8-page bulletin, well illustrated with photographs of numerous pieces of equipment that are available, has been isued by First Machinery Corp., 9th St. & East River Drive, New York 9, N. Y.

Progress Review—An annual review in which are recorded significant contributions to industrial progress has been issued by Allis-Chalmers Manufacturing Co., Milwaukee 1, Wis. Progress in the manufacture of equipment for the food industries is summarized.

Packaging Machine—Model CA-2, an adjustable wrapping machine which can be adjusted for a wide range of sizes and which allows many different styles of wrappings to be used, is described and illustrated in a 4-page booklet issued by Package Machinery Co., Springfield, Mass.

PLANT SUPPLIES

Revitalizing Lubricants—A more efficient seal, a method for refreshing and revitalizing lubricants in the bearings and a new series of self-sealed ball bearings within the standardized Extra Light series are described in a 4-page bulletin by the New Departure Division of General Motors Corp., Bristol, Conn.

Packaging Materials—A 12-page booklet, "Polyethylene Resins," has been published by Carbide and Carbon Chemicals Corp., 30 East 42nd St., New York 17. The brochure describes the forms, properties, fabrication procedures and uses of this group of thermoplastic materials, among which uses might be the packaging of foods.

Glycerine's 1,583 Uses—Glycerine's 1,583 uses are described in a new 34-page booklet published by the Glycerine Producers' Association, 295 Madison Ave., New York 17. The report states that glycerine is now in ample supply. Many of its applications in the food industries are described.

Plastics—The latest Celanese publication is a 10-page bulletin, in color, illustrating many applications. A copy of this bulletin can be obtained from Celanese Plastics Corp., 180 Madison Ave., New York 16.

Wire Grommet V-belts—Now available is a 4-page folder on wire grommet V-belts; issued by the Diamond Rubber Division of B. F. Goodrich Co., Akron, Ohio. The folder explains construction of the wire grommet V-belt.

MATERIALS HANDLING

The Palletized Load—Robert Gair Co., Inc., 155 East 44th St., New York 17, has released for distribution a new illustrated 28-page booklet, "The Palletized Load." This describes the philosophy of simplified packaging to effect economies in shipping space and handling costs. It has been cleared through the U. S. Navy, whose experiences with palletizing provide valuable information. Using the Navy method, one woman on a fork truck loaded a freight car in 2 hours. Before, the same work had required 14 men half a day.

Lift Trucks—A new bulletin featuring the automatic transporter platform and pilot-type motorized hand lift truck has been issued by Automatic Transportation Co., 101 West 7th St., Chicago 20, Ill. The many features of operation and application are illustrated and described in this 6-page bulletin.

MISCELLANEOUS

Sanitation—Prevention of occupational diseases, proper washroom and plant sanitation and pest control are discussed in a new 68-page illustrated catalog issued by West Disinfecting Co., Long Island City 1, N. Y.

Tire Handbook—Pertinent data on tires for commercial service is given in a new 98-page handbook published by B. F. Goodrich Co., Akron, Ohio. The handbook deals with eight factors which affect truck tire life. One chapter is devoted to instructions on how to mount synthetic tubes correctly.

Take the $ $ $ $ $ $ $ out of $tone$

• Now, with critical war shortage of labor, streamline STONING in your mill. Removing stones has always been slow, laborious and costly out of proportion to other steps in processing cereals, soy beans, and other dry foods. To eliminate this great headache of the cereal and other dry food processors, we have developed a new type stoner — revolutionary in design, amazing in efficiency, low in first cost, in operation. Removes stones, glass, non-magnetic metals, and all other hard, dangerous contaminations from cereals, soybeans, and other beans, and other food products, with, 1) an action so sensitive the tiniest particles are easily removed; and 2) operating cost so low it is relatively insignificant; and 3) 99.9% efficiency. Capacity up to 16 tons per hour. *Write for Bulletin FI-245.*

SUTTON, STEELE & STEELE, Inc.
DALLAS, TEXAS
In Canada — Kip Kelly, Ltd., 68 Higgins Ave., Winnipeg
Foreign — Separations Engineering, Ltd., 133 Bush House, Aldwych, London

LUBRICATION
IS INDUSTRY'S
PRIME ESSENTIAL

The "all-out" production of the war period has not only proven the importance of proper lubrication but has effectively demonstrated the superiority of LUBRIPLATE Lubricants. Even the most confirmed skeptic must admit that when two surfaces do not touch, there can be no appreciable wear. The separating film of LUBRIPLATE is tougher. That is why LUBRIPLATE Lubricants impart longer life to shafts, bearings, and gears. LUBRIPLATE has qualities not possessed by conventional lubricants.

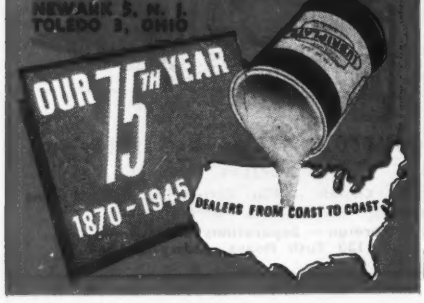
LUBRIPLATE
Lubricants definitely reduce friction and wear to a minimum. They lower power costs and prolong the life of equipment to an infinitely greater degree. LUBRIPLATE arrests progressive wear.

LUBRIPLATE
Lubricants protect machine parts against the destructive action of rust and corrosion. This feature alone puts LUBRIPLATE far out in front of conventional lubricants.

LUBRIPLATE
Lubricants are extremely economical for reason that they possess very long life and "stay-put" properties. A little LUBRIPLATE goes a long way.

Write for a booklet, "The LUBRIPLATE Film", written especially for your industry.

LUBRIPLATE
FISKE BROTHERS REFINING CO.
NEWARK 5, N. J.
TOLEDO 3, OHIO



Art, Technology Team Up on Liederkranz

(Continued from page 87)

are used by the restaurant, hotel and dining-car trade.

For 11 succeeding days, each individual 4-oz. piece is treated daily with a rubbing procedure, after light dipping in water, to seal the whey holes and start formation of a crust. During this period the cheese is also turned daily and covered with reed mats, alternately wet-cold and hot-dry.

Then come two light surface massaging operations, and on the last day of factory curing a cover of hot mats is employed.

When the cheese leaves the factory, a firm crust has formed but little cure or flavor is developed. A period of three weeks is allowed for the cheese to be transported to distribution centers, on to retail food stores and into the hands of consumers. Liederkranz reaches the peak of flavor and texture development between the third and fourth week after it leaves the factory when kept under controlled refrigerated temperatures. If it should warm up above 60 deg. F the ripening process speeds up measurably.

Packaging

Variations in the shape of the 4-oz. finished pieces make machine wrapping difficult; it is hoped, however, to develop machine wrapping in part and machine labeling in the postwar period.

A parchment wrapper is applied to the cheese first, then a second wrapper of metal foil and a paper label over the long dimension of the piece. The pieces are packed six to the wooden box, which permits breathing and enables normal ripening to proceed while the cheese is in transit from the factory to retail store.

Strict Sanitation

Within the plant all milk receiving and pasteurizing equipment is sterilized daily. The tile walls of the draining, salting and curing rooms are washed down weekly. The basswood salting room boards are washed in specially designed equipment and steamed at 210 deg. F. All reed mats are boiled after use and dried overnight in a steam-heated room.

Wherever possible, scientific technics are applied in the production of Liederkranz cheese—plus the art of skilled cheesemakers.

LUBRIPLATE
THE MODERN
LUBRICANT

THERE IS A LUBRIPLATE PRODUCT FOR YOUR EVERY NEED

LUBRIPLATE represents one of the most important advancements in lubrication in many years. It possesses characteristics not found in conventional lubricants. In addition to superior lubricating qualities it prevents rust and corrosion. The adoption of LUBRIPLATE by practically all important industries and the Army and Navy is indeed a record of achievement. LUBRIPLATE is available in a number of fluid and non-fluid densities to meet every operating condition.

Rx FOR YOUR MACHINERY

No. 3—Ideal for general oil type lubrication. Ring oiled bearings, wick feeds, sight feeds and bottle oilers.

No. 8—Because of its high film strength and long life reflects outstanding performance in most types of enclosed gears (speed reducers).

No. 107—One of the most popular grease type products for general application by pressure gun or cups.

No. 70—For a wide range of grease applications, especially at temperatures above 200 degrees F.

No. 130-AA—Known nationwide as the superior lubricant for open gears, heavy duty bearings, wire rope, etc.

BALL BEARING—This is the LUBRIPLATE lubricant that has achieved wide acclaim for use in the general run of ball and roller bearings operating at speeds to 5000 RPM and temperatures up to 300 degrees F.

Write for a booklet, "The LUBRIPLATE Film" written especially for your industry.

LUBRIPLATE
FISKE BROTHERS REFINING CO.
NEWARK 5, N. J.
TOLEDO 3, OHIO

CRACKERS YOU CAN EAT IN BED—

but won't like!

Cause for divorce is the eating of crispy, crunchy, skin-scratching crackers or cookies in bed. And cause for divorce from a baker's goods are crackers or cookies that arrive at a bedside as soggy and limp as a wet newspaper.

But, today, there's an easy out for food packers who want to get their products to point-of-use in *repeat sale* condition.

To preserve the quality of all manner of packaged foods, pre-packaged, processed or frozen meats, Keller-Dorian offers a new, war-tested *functional* packaging paper. This new Keller-Dorian *functional* packaging paper is available in two types: plastic coated and aluminum foil coated. They are either moisture-vapor proof (M. V. T. of 1.3 grams) and grease proof, or, moisture-vapor, grease, and light-proof.

Coatings are permanent, will not crack or peel . . . will not become brittle or tacky within a temperature range of 190° above to 50° below zero (F).

Keller-Dorian *functional* papers may be heat-sealed, cut, scored and folded to form any shape, size and style of package or container. They are non-toxic; seal-in flavor, seal-out foreign odors and tastes.

No matter what your field of packaging, chances are, Keller-Dorian's unique *functional* packaging papers and experience, techniques and thinking will be of value to you. Write today for free testing samples and data sheets.

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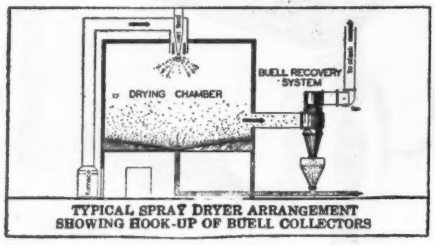
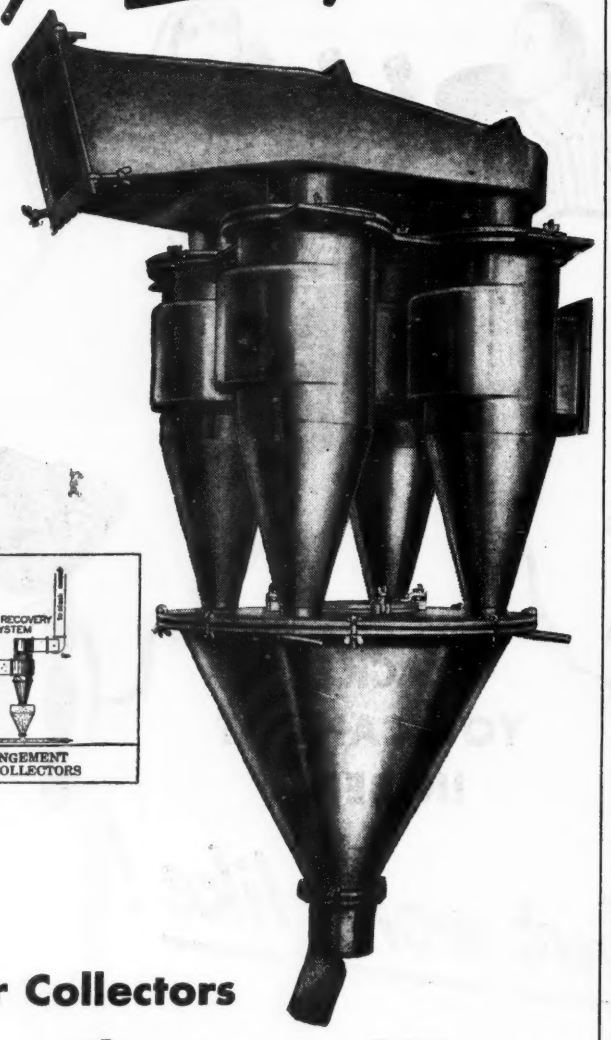
CORPORATION
Empire State Building
New York 1, N. Y.

FUNCTIONAL PACKAGING PAPERS *for Protecting Perishable Products*

IN *Dehydrating* MILK



TYPICAL SPRAY DRYER ARRANGEMENT SHOWING HOOK-UP OF BUELL COLLECTORS



Buell Powder Collectors *Eliminate Waste*

It has been estimated that, without proper provision for recovery, as much as 15% of the milk powder from spray drying operations may be lost in the exhaust. Buell Powder Collectors eliminate this waste, quickly pay for themselves in savings. The material recovered by Buell Collectors is immediately and automatically returned to the regular production.

In spray drying milk, eggs, or any other food products, Buell Powder Collectors should be an integral part of the system. The rapid acceptance of Buell equipment by the food industry and its successful applications to the problems of dehydration are the result of Buell's leadership in dust recovery throughout industry.

buell
POWDER RECOVERY SYSTEMS

For further information, write for factual 28-page book, "Bulletin G-842"

BUELL ENGINEERING COMPANY, INC.
Suite 5000, 8 Cedar Street, New York 5, N. Y.
Sales Representatives in Principal Cities

DESIGNED TO DO A JOB, NOT JUST MEET A "SPEC"

Ideas for Bakery Of Tomorrow

(Continued from page 71)

Sugar Sieves and Such

Where powdered sugar is ground in the plant, it will be an advantage to sieve the sugar through bolting cloth after grinding, particularly where this sugar is to be used in the preparation of icings. Sugar as it comes from the grinder or pulverizer is rarely of 4X or 6X fineness, but carries a sufficient percentage of coarser particles or "grits" to materially change the character of icings made with it.

The advantages of having a plant of several stories and having a railroad siding in connection with the plant are obvious. But like good water supply and nearness to markets, those essentially are matters of plant design and location and usually have to be taken care of in the beginning of the business.

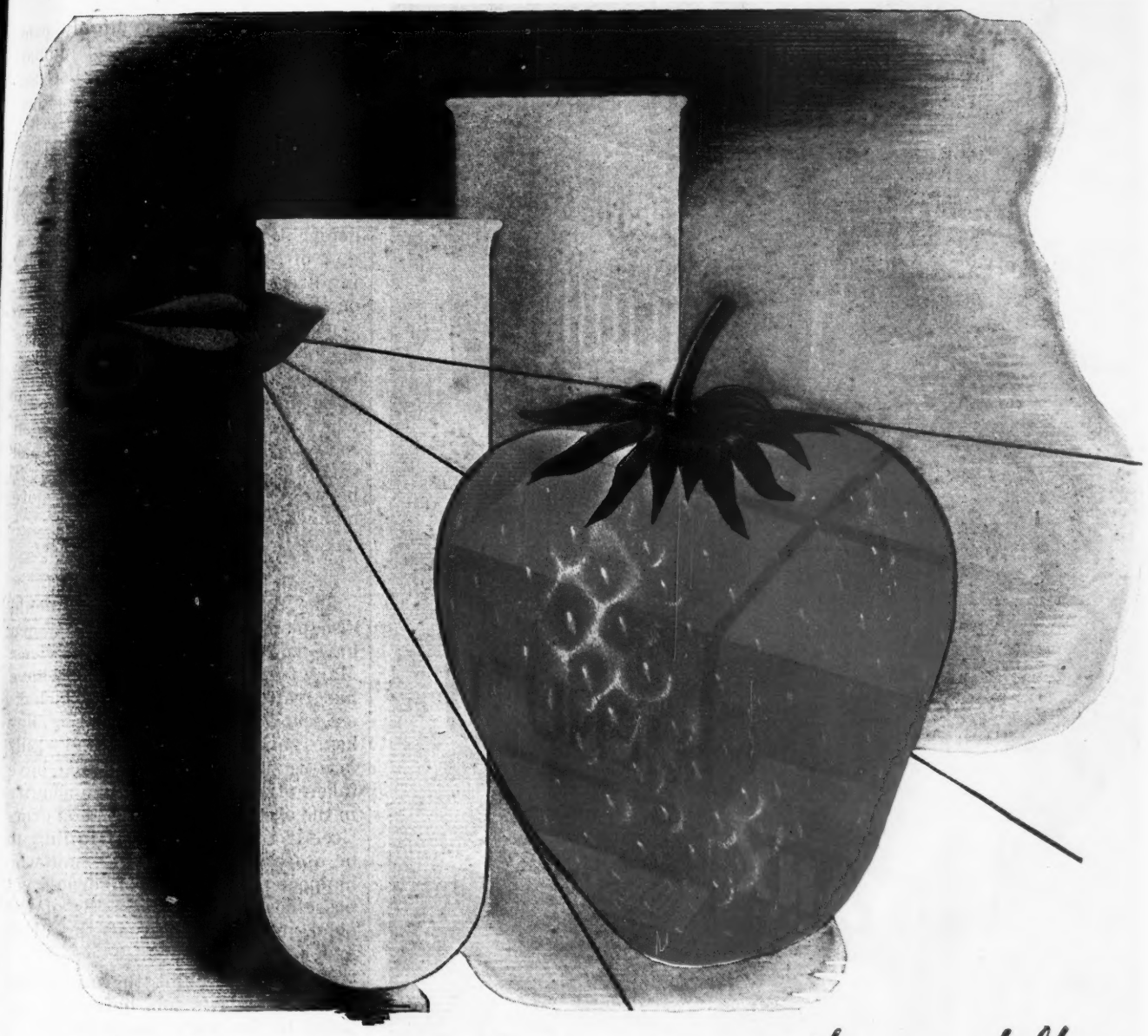
But of much more importance to the bakers' attempt to hold on to his new markets will be the attitude of management to the businesses which are in their hands. A great deal depends upon the way in which management views its problems and itself, because there is the whole key to quality of production and to production costs.

No one pretends that it is essential for the operator of a depositing machine, or an oven man, or a salesman driving a truckload of cake, to be thinking of these things. But it is necessary that bakery management be aware of them. And the more management couples thought—particularly this quality, because it is so rare—and action, the likelier it is that tomorrow's will be a bright day for the baker.

Chiseling on the buying end, or the use of lower quality ingredients, or the employment of cheap labor, are not the solutions to the lowering of production costs. But the answer can be found in the sort of creative production engineering mentioned previously.

Whose Hair Is Whitest?

There could be, quite generally, a raising of the status of those on the production side of the house so far as standing with management is concerned. To most managements in the baking industry—it quite probably is general throughout all industry—the salesman is the white-haired boy, the boss' darling, and all the rest of it.



double-refined *to minimize the cereal flavor*

MELOJEL is a better all-purpose food starch that is double-refined to minimize the flavor characteristics of ordinary corn starch and yield a softer, smoother jell with a creamier texture.

Every application in the food field for regular corn starch will benefit markedly by a switch to MELOJEL — the all-purpose food starch that gives you more for your corn starch dollar . . . when used in pies, pastries, caramels, salad dressings, puddings, icings, toppings, prepared dry mixes, fillings, etc.

Double-refined by modern methods, MELOJEL is a pure edible starch — actually purified beyond the normal processing of food starches. It possesses a bland or neutral flavor; a creamy smoothness and translucence; and better resistance to watering than ordinary corn starch — qualities that add considerable sales value to food prepared from colorful fruits and delicate flavors.

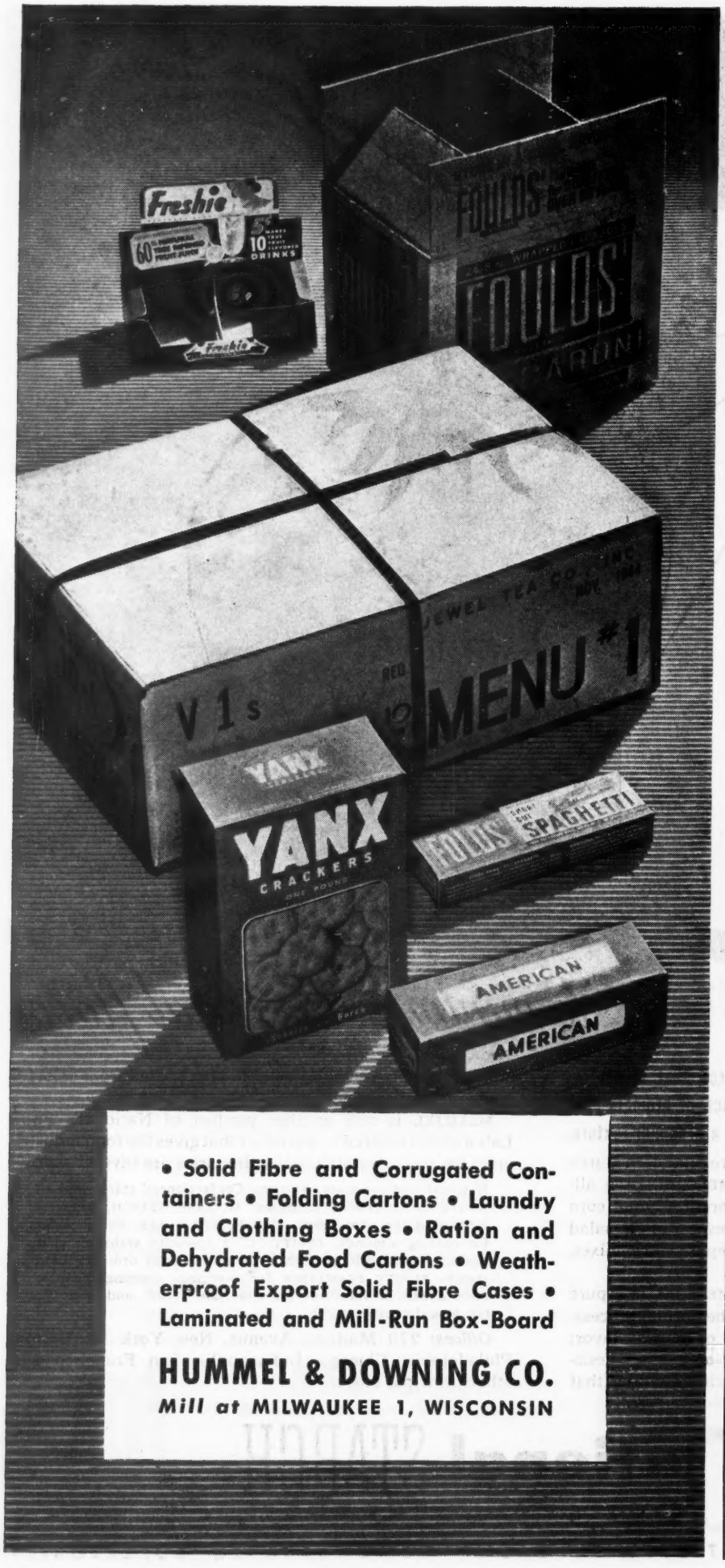
MELOJEL is still another product of National's Food Laboratory research . . . a product that gives the food industry more for its corn starch dollar. Inquiries are invited — NOW!

National also produces: FLOJEL, Confectioners' starch and all accurately controlled fluidities; MOLDING STARCH, properly lubricated for gum drops, etc.; PURITY GLAZE, an oil-sealer for coating almonds; PURITY "C" a specialty stabilizer that produces fruit fillings with a lower jell than ordinary corn starch; PURITY STABILIZER for meringue toppings, icings; CHOCOLIZER, a stabilizer for chocolate syrup; and AMIOCA, the new domestic starch.

Offices: 270 Madison Avenue, New York 16; Boston, Philadelphia, Chicago, Indianapolis, San Francisco and other principal cities.

National STARCH PRODUCTS

STARCHES—AND SPECIALTIES WITH EASILY DEMONSTRATED SUPERIORITY



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He usually is more highly paid than the production man of similar position, and his views are listened to with more respect. Now, whether he is more highly paid because his views carry weight, or whether words of wisdom drip from his pearly teeth because he is highly paid—that is one of those nice academic points for discussion over a mug of Nelson's Blood beside a blazing fire while the rain beats fiercely on the roof tiles.

The attitude of most employers has been aptly summed up, however, by Dr. Otto Eisenschiml, in his thoroughly readable "Without Fame," when he quotes these words of an industrialist: "A man with a small salary is not worth listening to; if he were, he would be getting more money."

G.I. Joe Grows Up

The bakery of tomorrow should also plan to use the skills its men have learned while in the services. Many former bakery employees have had training in the cooks and bakers schools of the armed forces. They have gained experiences and skills in a relatively short time that have taken other bakers years to acquire in the ordinary routine of shop practice. It is a very human failing to be quite resentful of the man who happens to be much younger and yet possesses most of the skills of the older man, especially if the older man knew him when.

As a case in point, there is young Joe Doakes. His job, before he enlisted in the Navy, was a relatively unimportant one in the icing room of a large bakery. After three years of Navy training, he is rated as a baker 1st class. He knows his trade, and as evidence along that line, he can point to the fact that his pies and cakes have won first prizes in open competitions at several bases, against a field comprising many erstwhile first-rate civilian bakers. He's had his picture in the paper, and the hometown folks have heard about it. Altogether, quite a bit more recognition and opportunity have come to him than would have been his in the civilian job. Joe knows the Navy thinks he's a mighty good baker.

But back home, in the shop that Joe left, the older men still see Joe as the nice but rather dumb kid he was three years ago—a youngster who had sense enough to follow directions in the icing room but wasn't to be entrusted with more important jobs. If he wants to come back to his icing room job, that's all right.

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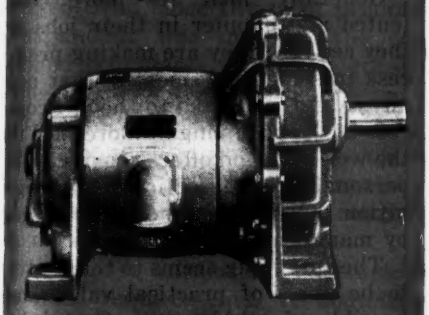
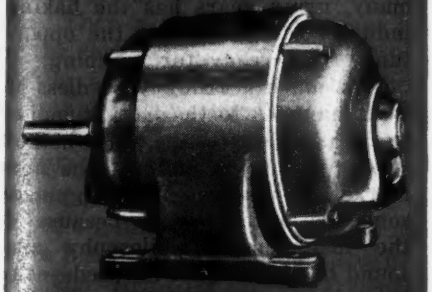
A revolutionary design of infinite variable speed, varying from 2:1 to 6:1. ¼ to 15 H.P.



STERLING SLO-SPEED MOTORS
Direct power applications in a wide variety of speeds and types. ¼ to 50 H.P. Sound gear engineering.



STERLING STANDARD KLOSD MOTORS
Constant speed integral H.P. general purpose motors in scores of sizes and types. ¼ to 75 H.P.

Sterling patented Herringbone Rotor is an exclusive feature of *all* Sterling squirrel-cage motors—Speed-Trol, Slo-Speed, etc.

The Herringbone Rotor provides smoother, quieter operation — eliminates end thrust — greatly improves performance characteristics. Solid one-piece pressure cast — indestructible — balanced. Sterling Motors with Herringbone Rotors insure "greater perform-ability."

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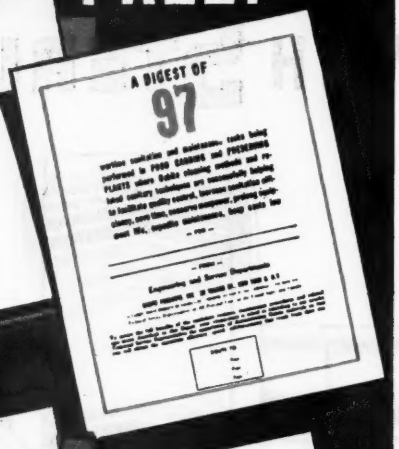
OAKITE GUIDES
to LOW-COST Sanitation
FREE!

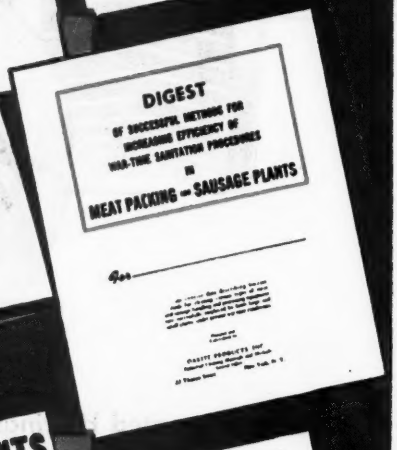
1. FOOD CANNING DIGEST

Successful Oakite answers to more effective cleaning of kettles, peelers, retort baskets, conveyor belts, spiral cooking coils and other equipment are contained in this 24-page sanitation guide. Digest also gives detailed data on low-cost scale and rust removal from water circulating and steam-jacketed units.



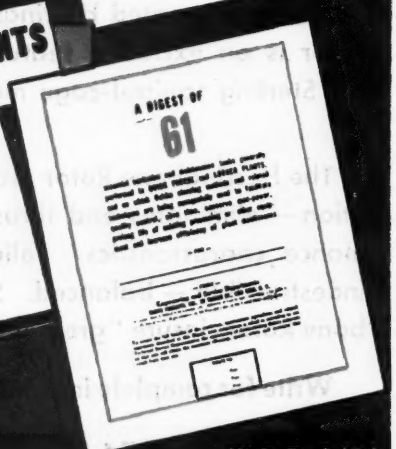
2. MEAT PACKERS DIGEST

Describes low-cost Oakite methods and materials to help speed-up and simplify the handling of your daily clean-up work in all departments. Over 58 various commonly recurring sanitation and maintenance tasks are discussed. Take full advantage of these time and money saving suggestions by sending for your free copy today!



3. QUICK FREEZE & LOCKER PLANTS

This Oakite Sanitation Digest, expressly prepared for operators of quick freeze, dehydrating and locker plants, gives many valuable, time-saving tips on daily clean-up of processing and handling equipment. A special section is devoted to safeguarding product quality through germicidal treatment of equipment surfaces.



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Check and mail for whichever of these FREE helpful Oakite Digests you would like to have.

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MATERIALS AND SERVICES FOR EVERY CLEANING REQUIREMENT

But Joe certainly isn't any 1st class baker as far as they are concerned, no matter what the Navy says.

How these situations, and there are likely to be many such, are ironed out depends largely on the attitude of management at the top. They cannot be left safely in the hands of supervisors and foremen.

Well, Why Not?

Why not, as an idea for tomorrow, institute a training program for employees? True, there may not be enough vacancies within the organization to absorb all those who acquire higher skills, and undoubtedly a certain percentage will drift away to other plants where they will get better jobs because of their extra training. But in the main, the employees will stick and the level of technical skill within the organization will go up. This will bring benefits to the organization in the way of more efficient operation, less wastage of materials, higher quality of product and better employee morale.

Generally, men are more contented and happier in their jobs if they see that they are making progress in some direction and that not all roads are blocked to them. Progress in the acquiring of more skill in the work at hand offers considerable personal ego satisfaction, and recognition of this fact should be taken by management.

The foregoing seems to the writer to be goals of practical value and possible of achievement. Certainly, this is the time to plan for and give direction to the course which we desire the future to take, for not in many, many years has the baking industry had offered it the opportunity now ready for grasping.

This much is true: Regardless of what happens to the baking industry as a whole after the war, whether it keeps or loses most of the new market it has temporarily gained, some few bakeries will—because of the management philosophy and sound basic attitudes adopted—continue to forge ahead in production volume, profits and public esteem.

New Control Methods Raise Cheese Quality

MANUFACTURE of American cheddar cheese from pasteurized milk under precision control methods, has brought a sharp increase in the output of top-grade cheese in all plants where the operations have been tested, according to Dr. George E. Holm, head of research laboratories, Bureau of Dairy Industry, Department of Agriculture.

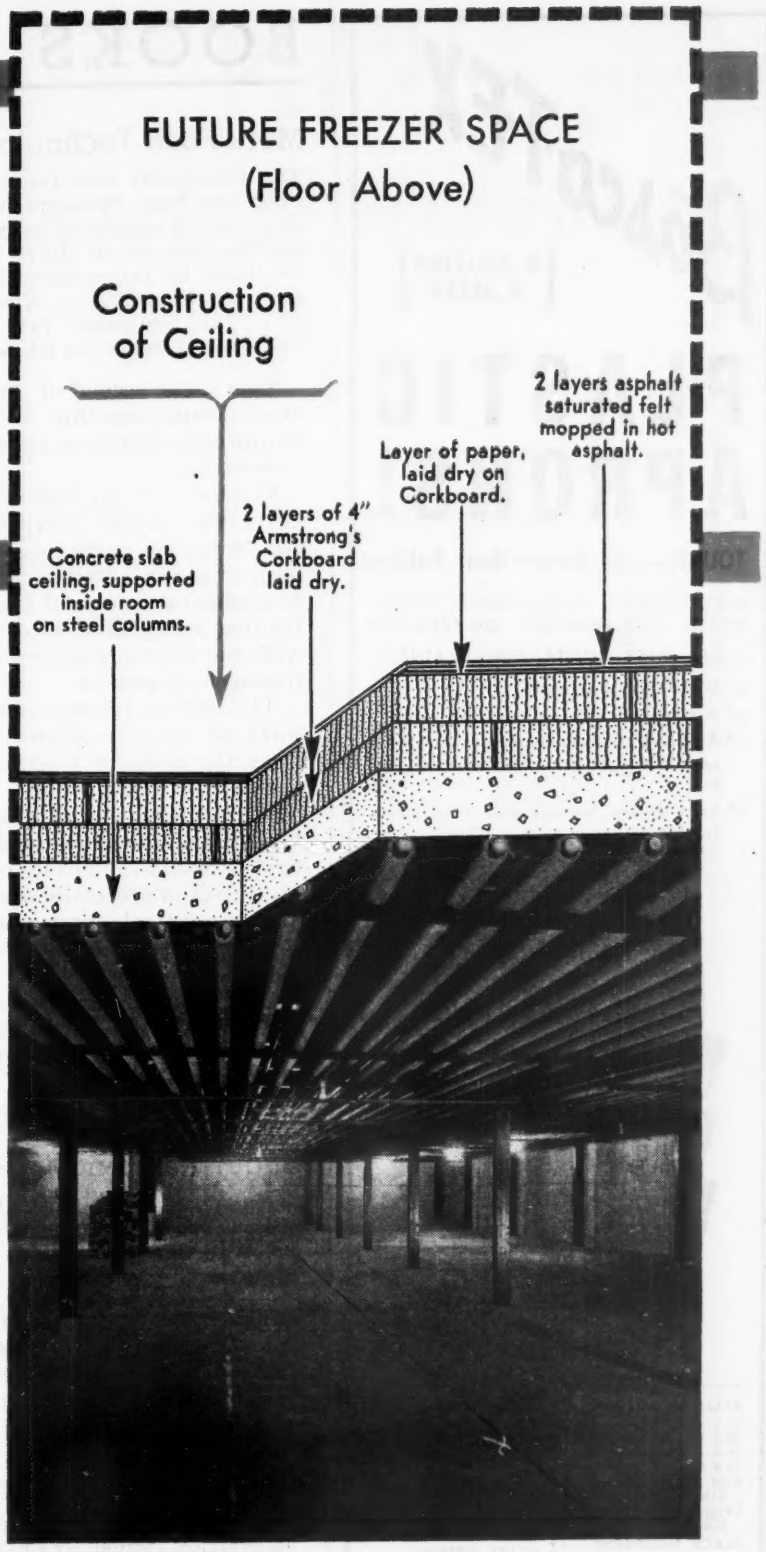
How to build a 20° BELOW ZERO FREEZER ROOM so it can GROW

ANTICIPATING an early need for even bigger below-zero freezer facilities, Badger Cold Storage Company of Milwaukee built their giant new freezer so it could be enlarged. And since the most practical way to expand it was upward, the company specified removable insulation construction in the ceiling.

This called for ingenious planning. The present room had to hold 20° below zero F. efficiently, and yet the ceiling insulation had to be installed so it could be removed and re-used later.

Armstrong's Insulation Contract Service met both requirements. It installed Armstrong's Corkboard 8" thick in floor and walls according to standard specifications. To insulate the ceiling, however, 8" of corkboard were laid dry on the floor of the vacant room above. Then a layer of paper was laid dry over the cork, and on top of that two layers of 15-lb. asphalt-saturated felt mopped in hot asphalt. The felts were flashed up the walls 6" to form an airtight seal above the cork. When the upper floor is converted into a second freezer, the felt and paper will be stripped off, and the corkboard removed and used to insulate the additional space.

Perhaps Armstrong's Corkboard — and Armstrong's Contract Service — can solve a special low-temperature problem for you. For complete information, write to Armstrong Cork Company, Building Materials Division, 4202 Concord Street, Lancaster, Pa.


FUTURE FREEZER SPACE
(Floor Above)
Construction of Ceiling
2 layers asphalt saturated felt mopped in hot asphalt.
Layer of paper, laid dry on Corkboard.
2 layers of 4" Armstrong's Corkboard laid dry.
Concrete slab ceiling, supported inside room on steel columns.

Badger Cold Storage Co. of Milwaukee, Wis., recently completed this freezer room to operate at 20° below zero. The ceiling is so constructed that when additional freezer space is put into service directly above, all cork in the ceiling can be removed and used in new construction.

ARMSTRONG CORK COMPANY

Complete Insulation Contract Service for All Temperatures, from 300° below zero to 2600°F.

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[4 COLORS 4 SIZES]

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WATER-PROOF, ALKALI-PROOF, STAIN-PROOF, ACID-RESISTANT, OIL-RESISTANT

NOTE THESE OUTSTANDING FEATURES!

- Will not crack or peel
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- Save clothes, laundry bills, time, effort, trouble

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27 x 36..$10.50 per doz.
30 x 36.. 11.25 per doz.
36 x 40.. 15.00 per doz.
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Full Length Sleeves $10.25 per dozen pair
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27 x 36..$12.90 per doz.
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27 x 36...$6.25 per doz.
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36 x 44... 9.25 per doz.

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BOOKS

More Food Technology

THE CHEMISTRY AND TECHNOLOGY OF FOOD AND FOOD PRODUCTS, Volume II. Prepared by a group of specialists under the editorship of Morris B. Jacobs. Published by Interscience Publishers, Inc., 215 Fourth Ave., New York 3, N. Y., 1944. 890 pages; 7x10 in.; cloth. Price, $10.50; set of two volumes, $19.00.

This is the second of the two volumes comprising this work on the technical and chemical phases of food processing.

Volume I (FOOD INDUSTRIES, August, 1944, p. 132) covered the first two of the six parts into which the book is divided. They dealt with the fundamental aspects of food chemistry that are common to all foods and with the descriptive aspects of particular food groups

This second volume continues the work of its 41 collaborators taken from the fields of food technology, chemistry, biochemistry, bacteriology, sanitary engineering, public health, food inspection and entomology. It covers the phases of unit operations and processes, sanitary and quality control, preservation and production. Throughout the entire book, the role played by adequate nutrition in modern life is stressed.

The appearance of this second volume completes an encyclopedic job on food technology and one that should rank high in the food world.

Sugar Reference

MANUAL OF SUGAR COMPANIES 1944, 22d edition. Published by Farr & Co., 120 Wall St., New York 5, N. Y. 233 pages; 5x8 in.; paper. Price, $1.00.

This is the latest edition of a manual containing the important statistics of sugar companies and the sugar industry, along with general information of reference value.

Postwar Employment

PERSONNEL PROBLEMS OF THE POSTWAR TRANSITION PERIOD. By Charles A. Myers. Published by the Committee for Economic Development, 285 Madison Ave., New York, N. Y., October, 1944. 55 pages; 7¾x11 in.; paper. Single copies free.

One aspect of the transition from war to peace—when it comes—will be felt in the food industry as well as in other fields. The inevitable postwar shakeup in personnel is bound to come, and studies such as this one will go a long way toward cushioning the impact.

The study is based on the experience of 32 manufacturing and non-manufacturing companies in making plans to meet these personnel problems. It is intended, primarily, for management officials who have important personnel responsibilities. What these companies are planning to do about rehiring of service men, lay-offs, transfers and the many other problems that will arise holds a common interest for all industry.

Butter Oil

BIBLIOGRAPHY ON BUTTER OIL. Compiled by Carrie B. Sherfy. Published by U. S. Department of Agriculture, as Bibliographical Bulletin No. 5. For sale by the Superintendent of Documents, U. S. Government Printing Office, Washington 25, D. C. 40 pages; 5¾x9 in.; paper. Price, 10 cents.

Butter oil and milk oil are the terms applied, in the United States, to the milk fat that remains after the curd and water have been removed from butter. This little booklet includes material on the preparation, properties, keeping qualities and uses of pure milk fat. Annotations on the manufacture, preservation and shipping of butter oil are also offered. It is pointed out, however, that material dealing with milk fat in dairy products is not included.

GOVERNMENT PUBLICATIONS

FACTORS THAT AFFECT QUALITY IN THE FREEZING PRESERVATION OF PEAS. Western Regional Research Laboratory, Albany, Calif. Mimeographed AIC-66. Free. An information sheet summarizing present knowledge of varieties, preparation and sanitary controls.

DAIRY AND POULTRY MARKET STATISTICS 1943. Document CS-9 of the Office of Distribution, War Food Administration. Available from U. S. Department of Agriculture, Washington 25, D. C. Free. A detailed statistical summary of market data compiled by Dairy and Poultry Branch for the calendar year 1943.

A CHRONOLOGY OF AMERICAN AGRICULTURE, 1790-1940. A large folded chart prepared by the Bureau of Agricultural Economics. Free. Summarizes the history of American agriculture and important influences in food supply from Colonial days.

WHATEVER THE PRODUCT . . . . PLAN THE PACKAGE

For into every successful package must go the services of these three

1 THE TECHNICIAN Shellmar technicians visit your plant and make a personal study of your packaging, handling and production problems.

2 THE ENGINEER Shelmar engineers submit your product to extensive laboratory testing in conjunction with various functional materials.

3 THE DESIGNER Shelmar package designers create a colorful and eye-appealing design to insure maximum attractiveness and display possibilities.

Shellmar production is still largely devoted to war but these three important package planning services are immediately available.

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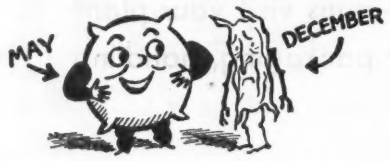
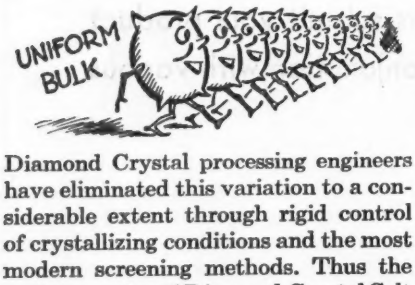
CONVERTERS OF CELLOPHANE, PLIOFILM, CELLULOSE ACETATE, SARAN, FOILS, PAPERS, GLASSINE, LACQUER COATINGS, VINYLS

"Whad'ya Know, Brother, About BULK?"

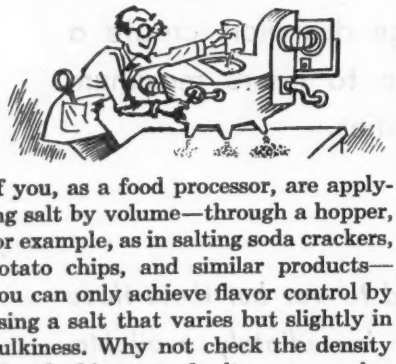
EVERY TECHNICAL man is supposed to know his own field thoroughly and have a general idea of related technical fields. But few food processors have time to develop more than a sketchy knowledge of these related subjects.



Take the bulkiness of salt—the specific gravity—which may vary rather widely. A survey of various salt products from different sections of the country has shown that even salt of the same grade can vary up to 25% in bulkiness over a period of months.



Diamond Crystal processing engineers have eliminated this variation to a considerable extent through rigid control of crystallizing conditions and the most modern screening methods. Thus the various grades of Diamond Crystal Salt will not vary more than 4% plus or minus—usually not over 2%.



If you, as a food processor, are applying salt by volume—through a hopper, for example, as in salting soda crackers, potato chips, and similar products—you can only achieve flavor control by using a salt that varies but slightly in bulkiness. Why not check the density of each shipment of salt you are using and see how much it varies in bulk?

NEED HELP? HERE IT IS!

If this is the solution to that variable-flavor problem, write our Director of Technical Service. He will be glad to help you find a cure. Diamond Crystal, Dept. J-4, St. Clair, Michigan.

DIAMOND CRYSTAL
ALBERGER PROCESS **SALT**

PATENTS

Butter and Small Proportion of High Melting Fats Aerated With Finely Dispersed Gas to Make Creamed Butter Spread—Charles S. Howe, Pasadena, Calif., to the Industrial Developments, Inc., Los Angeles, Calif. No. 2,357,896. Sept. 12, 1944.

Riboflavin Produced by Growing *Candida guilliermondia* Upon Nutrient Media Containing Selected Mineral Salts — Paul R. Burkholder, New Haven, Conn., to Research Corp., New York, N. Y. No. 2,363,227, Nov. 21, 1944.

Fresh Fruits or Vegetables Protected Against Withering or Shrinkage by Application of Thin Fluid Water-Wax Emulsion—Charles De Witt Cothran, Pomona, Calif., to Brogdex Co. No. 2,363,232. Nov. 21, 1944.

Butter Conditioned in Thermostatically Controlled Storage Compartment—Albert F. Wild, Scotia, N. Y., to General Electric Co. No. 2,363,375. Nov. 21, 1944.

Pies Made to Have Layer of Prebaked Crust Between Layer of Unbaked Bottom Dough and Filling, to Resist Soaking of Filling Juice Into Bottom Crust Dough During Baking—Victor N. Calia, Brooklyn, N. Y. No. 2,363,395. Nov. 21, 1944.

Spray Dried Milk Powder in Bulk Subjected to Vacuum Corresponding to Absolute Pressure of 10 In. of Mercury for Not Less Than 10 Hr. Prior to Packaging in Consumer Containers Under Non-oxidizing Conditions — Helge Shipstead, Syracuse and Arthur Paul Brant, Little Valley, N. Y., to Borden Co. New York, N. Y. No. 2,363,445. Nov. 21, 1944.

Hair Recovered From Hide by Disintegration of Hide Tissue With Papain Followed by Steam Treatment Under Pressure of 5 to 20 lb. per sq. in.—Victor Conquest, Chicago, and Havard L. Keil, Clarendon Hills, Ill., to Armour & Co., Chicago, Ill. No. 2,363,646. Nov. 28, 1944.

Shortening Stabilized by Addition of Tocopherol-containing Deodorizer Sludge Preliminary to Hydrogenization and Subsequent Alkali Refining — Jakob L. Jakobsen, Minneapolis, Minn., to General Mills, Inc. No. 2,363,672. Nov. 28, 1944.

Protein Hydrolyzed by Liquid Having Solids Content of Sour Milk Whey and Acidity of at Least 1 Percent Calculated as Lactic Acid — Lloyd A. Hall, Chicago, Ill., to Nicholas L. Simmons, Norrie, Wis. No. 2,363,730. Nov. 28, 1944.

Fruit Hull Mechanically Ejected From Juice-extracting Machine by Means of Tilting Movement of Fruit Receiver—Frederick L. McCulloch, Tampa, Fla. No. 2,363,798. Nov. 28, 1944.

Food-filled Containers Heat-treated During Passage Through Chamber Equipped With Rotatable Reel—Albert R. Thompson, Los Gatos, Calif., to Food Machinery Corp., San Jose, Calif. No. 2,363,818. Nov. 28, 1944.

Soya Flour Made Into Paste With Acidic Fruit Pulp Preliminary to Slow Drying for Removal of Excess Moisture, to Retard Soya Flour Dehydration—Artemy Alexis Horvath, to Horvath Laboratories, Inc., Chambersburg, Pa. No. 2,363,864. Nov. 28, 1944.

Gelatine Derivatives Formed by Heat-treating Gelatine in Presence of Lower Fatty Acid — Jean Baptiste Monier, Montreal, Quebec, Canada. No. 2,363,892. Nov. 28, 1944.

Vegetables Blanched, Quick-cooled, Subjected to Current of Dry Air to Remove Surface Moisture, Sterilized With Ultraviolet, Packaged in Heat-sealable Flexible Container and Subjected to Vacuum Preparatory to Hermetically Sealing Container and Freezing—Duryea Bensel, to Bensel-Brice Corp., Los Angeles, Calif. No. 2,364,049. Dec. 5, 1944.

Residue Yeast Separated From Green Fermented Beverage; Freed From Hop Seeds, Leaves and Other Non-yeast Solids; Mixed With Portion of Green Beverage; Saturated With CO_2; Heated While Subjected to High CO_2 Pressure; Ruptured by Sudden Release of Pressure and Freed From CO_2 and Water Vapor Preparatory to Adding Portion of Liquid Fraction of Remaining Mass to Fermented Malt Beverage—Marvin W. Ditto and William P. Torrington, New York, N. Y., to Emulsions Process Corp., New York, N. Y. No. 2,364,060. Dec. 5, 1944.

Starch Suspensions Thinned by Use of Less Than Half of Total Enzyme Normally Required—Herman H. Schopmeyer, Hammond, Ind., and Herbert A. Kaufmann, Pelham Manor, N. Y., to American Maize-Products Co. No. 2,364,590. Dec. 5, 1944.

Frozen Confection Covered With Firm, Non-sticking, Nonchipping, Noncracking and Non-flaking Coating Made to Consist of Starch, Sugar, Malt Powder, Dried Skim Milk Powder and Water—Norman M. Thomas, Medford Lakes, and Norman H. Thomas, South Orange, N. J., to Joe Lowe Corp., New York, N. Y. No. 2,364,592. Dec. 5, 1944.

Jelly-like Wax Emulsion to Increase Luster and Control Shrinkage and Decay of Vegetables Made by Saponifying Melted Candelilla Wax and Fatty Acids—James Otis Handy, Orlando, Fla., to Duzzell Corp., Dover, Del. No. 2,364,632. Dec. 12, 1944.

Aqueous Extracts Containing Water-soluble Vitamins of the B Group Treated for Removal of Objectionable Taste—Ben Maizel, to Vico Products Co., Chicago, Ill. No. 2,364,639. Dec. 12, 1944.

Citric Acid Produced by Growing *Aspergillus Niger* on Nutrient Medium Containing Organic Nitrogen, Potassium Salt of Organic Acid, and Sucrose—William Eisenman and Max D. Blumenfeld, to Heyden Chemical Corp., New York, N. Y. No. 2,364,701. Dec. 12, 1944.

Protective Coatings Made from Aqueous Zein Dispersions Using Alkali and Sulphonated Vegetable Oil as Dispersing Agent—Albert L. James, Tenafly, N. J., to Corn Products Refining Co., New York, N. Y. No. 2,364,792. Dec. 12, 1944.

Vegetable Oil Hydrogenated to Produce Glyceridic Oil—Casimer J. Borkowski, Chicago, and Jacob L. Schille, Berwyn, Ill., to Best Foods, Inc., New York, N. Y. No. 2,365,045. Dec. 12, 1944.

Starch Treated With Phosphoric Acid Preliminary to Conversion Into Amylaceous Acetate—George V. Caesar, Staten Island, N. Y., to Stein, Hall and Co., Inc., New York, N. Y. No. 2,365,173. Dec. 19, 1944.

Grain Freed From Dust During Sieving in a System Through Which Counter Current of Air Flows—Lawrence E. Egedal, Milwaukee, Wis. No. 2,365,179. Dec. 19, 1944.

Eggs Handled and Shipped in Covered Case Having Telescopically Mounted Tubular Liner Which Permits Sampling of Top and Bottom Layers—Kenneth C. Ferguson, to Inland Container Corp., Indianapolis, Ind. No. 2,365,182. Dec. 19, 1944.

Sour Cream Heated to Pasteurizing Temperature Under Partial Vacuum, Centrifugally Clarified, and Standardized in Acidity Preparatory to Making of Butter—Charles A. Rogers, Detroit, Mich. No. 2,365,217. Dec. 19, 1944.

Shelled Shrimp Layered Loosely on Open Mesh Traveling Conveyor and Subjected to Live Steam From Above and Below to Fix Color, Flavor and Texture Preparatory to Canning—Clyde H. Bloedorn, Chicago, Ill., to Continental Can Co., Inc., New York, N. Y. No. 2,365,519. Dec. 19, 1944.

Break Improver Made to Consist of Small Proportion of Sodium, Potassium, Ammonium, or Calcium Chlorite Dispersed in Edible Inert Carrier—Charles G. Ferrari, Minneapolis, Minn., to Mathieson Alkali Works, Inc., New York, N. Y. No. 2,365,534. Dec. 19, 1944.

Fruit and Vegetable Juices Extracted and Packaged Under Conditions of Continuous Light Exclusion — Nathaniel M. H. Blumenkranz, Peekskill, N. Y. No. 2,365,674. Dec. 26, 1944.

Predetermined Quantity of Powdered Ingredients Added to Pies by Mechanical Means — Lloyd J. Harris, Kenilworth, and Bernard Lambers, Oak Park, Ill., to Lloyd J. Harris. No. 2,365,699. Dec. 26, 1944.

Canadian Patents

Containers Filled With Food for Further Processing Head-spaced by Mechanical Means to Aid in Vacuum Sealing and Avoid Breakage During Retorting—Lynn E. Davies, Park Ridge, Ill., to White Cap Co., Chicago, Ill. No. 424,152. Nov. 28, 1944.

Aromatic Flavor Essences of Fruits and Vegetables Obtained by Distilling Raw Plant Material Under 26 In. of Mercury Vacuum While Subjected to Controlled Heating—Harry Alfred Noyes, Watertown, Mass. No. 424,305. Dec. 12, 1944.

Shark Liver Oil Mixed With Vegetable Meal and Heated in Presence of Inert Gas Under Less-than-atmospheric Pressure and Between 160 to 180 Deg. C. to Give Odorless and Tasteless Natural Vitamin-containing Oil—Loran Old Buxton, Belleville, N. J., to National Oil Products Co., Harrison, N. J. No. 424,383. Dec. 12, 1944.

FOOD TECHNOLOGY

NEW DISCOVERIES AND INVENTIONS

MEATS

Smoked Meats

ALTERATIONS of the protein constituents and redistribution of the curing salts probably occur during the period between curing and smoking of bacon. For Canadian Wiltshire sides cured 9 days according to regular commercial practice, it was found that holding at 30 deg. F. for about 15 days before smoking gave somewhat better flavor in the final product. The length of the holding period showed no significant effect on bacteria counts, color or fat oxidation during storage after smoking. Meat could be held as much as 25 days between curing and smoking without loss of keeping qualities in the final product.

Lightly cured smoked bacon has been found suitable for export from Canada to England.

Digest from "Smoked Meats. III. Effect of Maturation Period on Quality," by W. H. White, A. H. Woodcock and N. E. Gibbons, Canadian Journal of Research, vol. 22, 107-18, September, 1944.

PEST CONTROL

Beetles in Biscuits

INSECTS can not cause general damage in a foodstuff unless that foodstuff is favorable for their development. Using the rate of development of insects feeding on a foodstuff and the percentage survival of the insects as criteria of susceptibility to insect damage, the Grain Research Laboratory, Board of Grain Commissioners for Canada, has determined that hard biscuits of the type used in Army emergency rations are not susceptible to spoilage by the confused flour beetle.

They make the following points: Rate of development and percentage survival of the Tribolium larvae raised on whole or ground biscuits are much less than for those on flour controls. Destruction of thiamine during baking may be responsible. High fat in the biscuits was somewhat more unfavorable, while high moisture and use of long extraction flour were somewhat more favorable to the insects.

Clarifying the problem from the standpoint of behavior of foods during storage, the authors present curves showing the moisture equilibrium attained at different levels of atmospheric humidity for biscuits having 2, 7 and 12 percent fat, and also the effect of short- and long-extraction flours. Increasing the fat clearly lowers the initial and the equilibrium humidity of the biscuits. There is comparatively little difference due to type of flour.

Digest from "Susceptibility of Biscuits to Insect Damage," by B. N. Smallman and T. R. Aitken, Cereal Chemistry, vol. 21, 499-510, November, 1944.

BAKERY PRODUCTS

Sugar Product

TEXTURE and stability of cream fillings for cookies are improved through the use of a spray-dried corn sirup to replace part of the sucrose.

A sirup with a dextrose equivalent of 35 to 55 percent, dried to a moisture content of 1 to 4 percent, with a particle size such that all of it passes a 40-mesh screen and an appreciable amount passes a 200-mesh one, is used. Forty-five pounds of the noncrystalline spray-dried solids are aerated in a mixer with 55 lb. of pulverized sucrose and 50 lb. of a wide-softening-range fat such as coconut butter.

The filling has a desirable volume stability, with high adhesive and cohesive properties, and the added advantage of neither contributing moisture to the cookie on which it is spread nor removing moisture from it.

Digest from U. S. Patent 2,359,228, issued September 26, 1944, to R. L. Lloyd and P. H. Prentiss, and assigned to American Maize-Products Co., New York.

INDUSTRIAL HYGIENE

Fish Poisoning

SKIN infections of a type distinct from those caused by the pus-forming bacteria commonly present on the skin occur among workers handling fish and shellfish.

The infections are characterized by local swelling, itching, sometimes blisterng, pain and discomfort. There is little or no pus formation. Depending on the type, such infections may last from one to four weeks. Known causes include puncture of the skin by scales or teeth of fish or by the claws and shell of a shellfish. Cannery workers have developed serious infections as a result of the accumulation of particles of fish around the fingernails. One type seems to be due to bacteria similar in many respects to those associated with fish spoilage.

These infections are not improved by the sulpha drugs or penicillin.

Recommended preventative measures for those liable to infection from handling fish include washing the hands and arms in dilute antiseptic solution as soon as work is completed. Dakin's solution or a 1 percent solution of a commercial cresolic compound, such as Lysol or Izal, will be found suitable. Application of an antiseptic jelly to the hands to prevent chapping is also helpful.

All cuts or abrasions should be treated promptly with a suitable germicide. The authors mention tincture of iodine or an organic mercury compound such as metaphen or merthiolate.

If an infection becomes established, it should be treated by a physician.

Digest from "Fish Poisoning," by H. L. A. Tarr, Progress Reports of the Pacific Coast Stations, Fisheries Research Board of Canada. No. 61, 13-15, November, 1944.

CEREAL PRODUCTS

Dehulling Seeds

DEHULLING of oats and barley, for determination of the percentage of kernel, can be accomplished mechanically in the laboratory by means of an air blast. The determination is of importance in judging varieties for feed, since the hulls are without value but normally remain attached to the grain.

Hulls are removed by the violent agitation of a grain sample in a "cup," a cylinder 2¼ in. deep and 2¼ in. in diameter, with one closed and one open end. The mechanism of removal of the hulls is not just the same for barley and for oats. Barley hulls are removed by peeling, oat hulls are loosened by the repeated impact with the sides of the container.

The cup is placed on its side, with the air-blast nozzle near the bottom of the open end. For barley it is lined with a wire screen, both sides and bottom. The top is covered with screening having 4 wires to the inch in one direction and 14 the other. Hulls after removal are blown out through this screen. Results are slightly higher than for hand peeling.

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but within the range of variation. The barley seed must be soaked in water at 130 deg. F. for 30 to 45 minutes before treatment and the sample must be dried before the kernels are weighed.

Oats are placed in the apparatus without soaking. A cardboard lining, including the top, is used when the humidity of the grain is low, and a metal lining when the grain has a higher humidity. Loosened hulls must be blown away from the kernels after the apparatus is opened. The kernels can be weighed without drying.

Dehulling takes from 2 to 3 minutes for oats, 10 to 15 for barley.

The principle may have commercial possibilities in the preparation of dehulled grains.

Digest from "The Air Jet Method of Dehulling Seeds," by C. R. Fraser, Canadian Journal of Research, vol. 22 1257-62, September, 1944.

PRESERVATIVES

Propylene Glycol

PROTECTION of fruit juice with a chemical that, in the course of the normal time before consumption, becomes harmless and not detectable by taste or appearance, is suggested in one recent patent.

In this specific example propylene oxide is added to fresh cider. Bacteria are destroyed rapidly. The juice is hermetically sealed immediately after addition of the organic acid, without heat processing. Within a very few days the propylene oxide will have hydrolized to propylene glycol, which is described as colorless, tasteless, odorless and entirely innocuous as a minor constituent of food or drink. The period for this reaction to take place is less than the normal time required for shipment and delivery to the consumer. The preserved juice remains completely fresh until opened, when it can be distinguished from fresh cider only by the presence of the propylene glycol on chemical test.

Digest from U. S. Patent 2,354,014, issued July 18, 1944, to E. C. Haines.

FATS AND OILS

Data on Peanut Oils

CLOSELY similar density and viscosity characteristics, with temperature and with iodine value, have been reported for hydrogenated cottonseed and hydrogenated peanut oils. Knowledge of these properties is necessary, not only to design equipment for processing the oils but in selecting oils for various applications.

In hydrogenated peanut oils the

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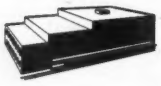

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density falls with increasing temperature, for any one iodine value, in a straight-line relationship. At any one temperature the viscosity decreases with increasing iodine value, but not linearly.

The accompanying table shows the similarity of values for cottonseed oil (previously reported in *Industrial and Engineering Chemistry*, vol. 36, 568, 1944) and those now found for peanut oil.

	Cottonseed oil	Peanut oil
Density at 100 deg. C.:		
Iodine value of oil 100 .	0.8675	0.8622
Iodine value of oil 50...	0.8570	0.8550
Coefficient k for the temperature-density equation $d_2 = d_1 - k\ (t_2 - t_1)$, where t_1 and t_2 are the respective temperatures in deg. C.	0.000638	0.000646
Mean coefficient of cubical expansion over the range of 30 to 200 deg. C. ...	0.000764	0.000764
Viscosity in centipoises at the indicated temperatures —oils having an iodine value of 100:		
50 deg. C. 23.5		22.7
100 deg. C. 7.10		7.18
200 deg. C. 1.96		1.96
Viscosity in centipoises at the indicated temperatures —oils having an iodine value of 60:		
50 deg. C. 29.5		27.8
100 deg. C. 8.05		8.26
200 deg. C. 2.03		2.07
Walther constant m, which relates temperature and viscosity	2.805	2.724

Digest from "Viscosities and Densities of Hydrogenated Peanut Oils," by F. C. Magne and H. Wakeham, Oil & Soap, vol. 21, 347-49, December, 1944.

FRUIT JUICES

Apple Flavor

VOLATILE aroma constituents for flavoring can be stripped from apple juice by flash vaporization from 320 deg. F. of 10 percent of the raw juice. To obtain a fresh flavor the juice must be subjected to elevated temperatures for not more than 10 seconds. The stripped juice is then suitable for production of bland sirup or vinegar.

In the system worked out on a pilot-plant scale, the flashed vapor is separated from entrained liquid and fractionated so that the final product has from 100 to 150 times the concentration of the flavoring constituents in the fresh juice.

The recovered flavor can be used with a bland apple sirup to make a concentrate to be diluted for beverage purposes. Any undesirable flavor in the raw material is concentrated with the wanted flavors, so that the apples must be carefully selected for flavor and quality.

Venting noncondensable vapors from the fractionator entails a loss of aroma constituents with which the vapors are saturated. The process must therefore be carefully controlled on a volume basis.

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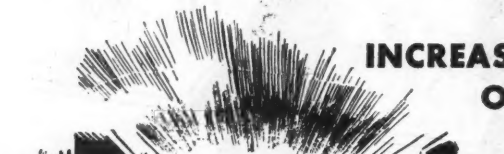

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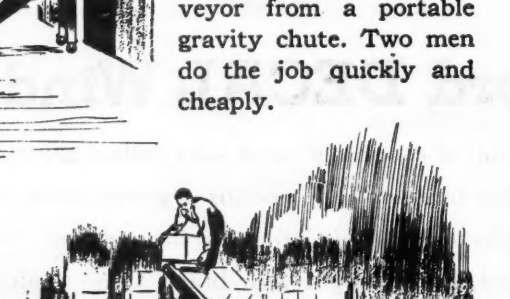

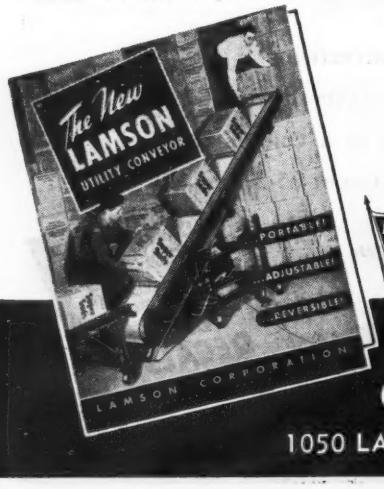

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factory for equipment, with bronze pumps. The superheater should be of stainless steel. Process control can be through the pump feed rates and the juice temperatures in the superheater and condenser.

The report lists equipment and suggests engineernig details for a plant with a capacity of 5,000 gal. of whole apple juice per 24 hours, continuous operation. This is based on experience in the operation of the laboratory pilot plant. Costs are also estimated.

Digest from "Recovery and Utilization of Natural Apple Flavors," by H. P. Milleville and R. K. Eskew, Mimeograph Circular AIC-63, Eastern Regional Research Laboratory, Bureau of Agricultural Chemistry, U. S. Department of Agriculture, September, 1944.

MISCELLANEOUS

Protein Source

COTTONSEED PROTEIN is recommended to supplement the diet in areas where cereals, particularly corn, constitute a major source of protein in the diet. According to the author, it can be used for food in a number of ways.

The protein of cottonseed flour is claimed to be a good source of nutritionally essential amino acids, with a growth-promoting value approximately 4½ times that of wheat flour. Addition of 5 percent of cottonseed flour to wheat flour produces a mixture containing 16 percent more protein than the wheat flour alone.

There is now available a partially defatted, wholesome and palatable cottonseed flour for human use. It has a protein content of 50 percent.

The globulin which forms the greater part of the seed protein is nearly as digestible as the casein of milk.

Digest from "Nutritive Value of Cottonseed Protein," by D. B. Jones, The Agricultural Situation vol. 28, 16, October, 1944.

pH Warns of Spoilage

MEASUREMENT of the pH at the surface of ocean fish gives a quick and dependable indication of the freshness or incipient spoilage.

A glass electrode pH meter is used. pH values should be 6.5 to 6.8 in fresh fish. The value falls usually to 6.25 to 6.4 in three to five days at 32 deg. F., then increases again. A surface value of 6.9 to 7.0 indicates incipient spoilage, 7.5 indicates a spoiled fish.

Interior values rise less sharply, and composite samples are less satisfactory than surface tests.

These changes in pH are due to the fact that trimethylamine, a strong base, is formed by the action of the mixed bacterial flora on the surface of the sea fish.

Digest from "A Rapid Test for Detection of Spoilage in Sea Fish," by W. J. Dyer, G. J. Sigurdson and A. J. Wood, Food Research, vol. 9, 183-87, May-June, 1944.

FORMULAS FOR FOODS

FORMULA NO. 515

Molasses Cakes

This formula permits the use of varying proportions of molasses and sugar, depending on the supplies available. Provided that the molasses is of a good flavor, the cakes will have a pleasing flavor and texture.

Standard Ingredients

Sugar	3 lb.
Shortening	3 lb.
Salt	2½ oz.
Whole eggs	3½ lb.
Standardized invert sugar	1 lb.
High-sugar-carrying flour	10 lb.
Cinnamon	1½ oz.
Ginger	¾ oz.

Ingredients Varied

Molasses	2½ lb.	5 lb.	7½ lb.
Sugar	3½ lb.	1¾ lb.	.....
Milk	6¼ lb.	5½ lb.	4¾ lb.
Baking powder	3 oz.	1½ oz.	.....
Soda	¾ oz.	1½ oz.	2¼ oz.

Directions

Cream the first portion of sugar, shortening and salt, until light. Add the eggs slowly and cream until light. In the meantime, make a solution of the second portion of sugar (if required), the molasses, invert sugar and liquid milk. Separately blend the flour, leavening and spices. Add the solution and flour, blend alternately to the creamed mixture. Mix the batter until smooth.

Bake at about 370 deg. F.

Formula from American Molasses Co.

FORMULA NO. 516

Sandwich Filling

6 X sugar	30 lb.
Full-fat soya flour	9 lb.
Salt	4 oz.
Emulsifier shortening	30 lb.
Vanilla*	4 oz.
Butter flavor or culture (optional)	1 lb.
Nougat fluff*	24 lb.
Cold water*	15 lb.

* May be varied.

Directions

Blend the sugar, soya flour and salt well together by sifting, add to the shortening, vanilla and flavor. Cream on low or medium speed until light. Add the nougat fluff and mix in thoroughly. Then add cold water gradually and cream until light.

For best results the temperature of the fats and finished icing should be 70 to 75 deg. F. Flavor and color may be added as desired. Regulate consistency of icing by varying amount of water.

Store in clean containers in a cool place. The nougat fluff may be increased up to 40 lb. for added lightness.

Nougat Fluff

Enzyme-converted corn sirup	60 lb.
Powdered egg whites	1 lb. 4 oz.
Water	2 lb. 8 oz.

Heat the invert sugar to 180 to 190 deg. F., then place in a clean whipping bowl. Start the machine on medium speed. Soak the egg white powder to dissolve, then add to the above and beat on high speed to the desired consistency. Adjust temperature to which the enzyme-converted corn sirup is heated so that when the albumen or powdered egg white solution is added the temperature of the mix will be approximately 179 deg. F. For a heavier type of nougat, reduce the amount of albumen.

This is only a suggested formula, and procedure must be tested carefully.

Formula from A. E. Staley Mfg. Co.

FORMULA NO. 517

Guava and Fig Filling

Guava paste	50 lb.
White fig paste	50 lb.
Clear sirup	47 lb. 8 oz.
Granulated sugar	12 lb. 8 oz.
Vegetable gum stabilizer	1 lb. 4 oz.
Water	30 lb.
Corn starch	1 lb. 4 oz.
Salt	4 oz.

Directions

Boil together the guava paste, white fig paste and clear sirup for 45 minutes, then shut off the steam. The granulated sugar, stabilizer, cornstarch, salt and water are cooked together as in making pie filling, then blended into the first mixture, mixing thoroughly.

This can be used in jelly rolls and layer cakes. It is suitable wherever date jam is used.

Formula from William Gordon, Awrey Bakeries, through American Society of Bakery Engineers.

FORMULA NO. 518

Peanut Butter Cookies

Peanut butter	3 lb.
Brown sugar	1 lb. 2 oz.
Granulated sugar	1 lb. 8 oz.
Vegetable shortening	1 lb. 8 oz.
Baking soda	1½ oz.
Whole eggs	1 lb. 8 oz.
Skim milk powder	2½ oz.
Water	1 lb. 1 oz.
Bread flour	3 lb. 12 oz.
Flavor	to suit

Directions

Cream together the peanut butter, sugar, shortening, and soda. Add the eggs. To this mixture add alternately the skim milk powder dissolved in the water and the flour. Mix in flavoring.

Bag out on slightly greased pans. Bake at 375 deg. F.

Formula from Experimental Bakery Armour & Co.

FORMULA NO. 519

Chocolate Fudge Sauce

Cocoa powder	1 percent
Unsweetened chocolate	4 percent
Granulated cane sugar	25 percent
Light brown sugar	10 percent
Butter (salted)	10 percent
Fluid whole milk	20 percent
Water	30 percent
Vanillin to flavor (about 2 oz. for 100 lb.)	

Directions

Combine the cocoa powder, cane sugar and light brown sugar by mixing them thoroughly while dry. Melt the chocolate and butter in a double boiler. Heat the water and milk to about 180 deg. F., then add the dry mix by stirring constantly until it is completely dissolved. Add the melted chocolate and butter gradually, continuing to stir until a homogeneous blend of ingredients is obtained by bringing the entire mix to a boil. Cool and flavor with vanillin.

To obtain a very smooth product it is recommended to run the entire mix through a colloidal mill or similar apparatus.

Formula from B. I. Masurovsky.

FORMULA NO. 520

Milan Cookies

Almond paste*	3 lb.
Granulated sugar	3 lb.
Hydrogenated vegetable shortening	3 lb.
Salt	3 oz.
Flavor	to taste
Pastry flour	6 lb.
Whole eggs	2 lb.
Liquid milk	1 lb.

* Kernel paste also can be used.

Directions

Scale all the ingredients into the mixing bowl and mix at medium speed to a smooth dough. This cookie dough can be mixed in as little as one or two minutes under ideal conditions.

Milk may be added in place of part of the eggs. Milk also may be added to give a softer dough if necessary in working through the machine.

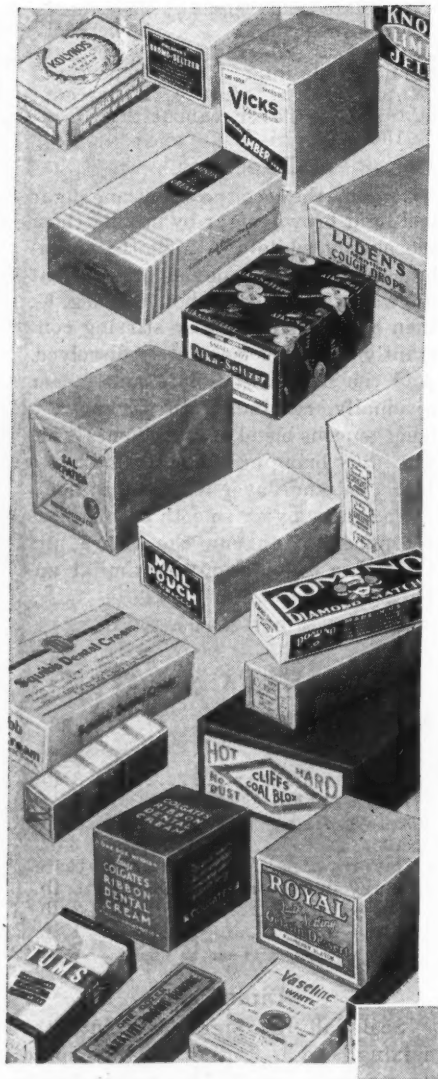
Total weight of the mix will be approximately 18¼ lb. Scaling weight, using a 2-in. die, is about 6 oz. per dozen. One to 2-in. dies can be used for this cookie.

Bake at 375 to 400 deg. F.

Formula from Procter and Gamble Co.

MACHINE BUNDLING SAVES UP TO 60%

ON MATERIAL COSTS ALONE



Faced with rising costs, more and more manufacturers are turning to machine bundling as an immediate and drastic cost-reducer. *We now have new orders from prominent concerns for 19 of these machines.*

Using strong paper, the machine makes a tightly wrapped bundle that stands up in shipment and handling so well that even compressed coal blocks are being bundled in this way.

And when you remember that the bundle replaces a made-to-order carton, you can see what a saving it would make in your material costs — not to mention labor. Shipping costs are also lowered, for the wrapping material weighs only one-third as much as cartons.

The machine can be fed directly from the individual wrapping or cartoning machines, and will assemble packages in various groupings—one layer, two layers, three layers, etc. Automatically attaches end-seals.

Write today for our circular on Machine Bundling

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Springfield 7, Massachusetts
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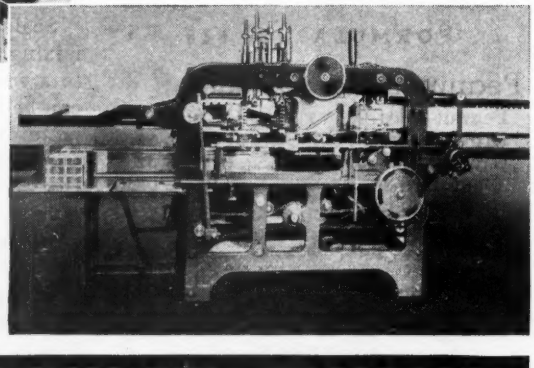

MODEL F-10
Quickly adjustable for various sizes

PACKAGE MACHINERY COMPANY
Over a Quarter Billion Packages per day are wrapped on our Machines

Poultry Packing Progresses

(Continued from page 76)

As they enter the eviscerating room, the birds pass through a gas singer for removal of remaining hairs. Initial incisions for viscera removal are made over the stationary trough, and the viscera are loosened. Upon reaching the conveyor table, the viscera are removed and placed in the conveyor pan directly below the suspended bird. They keep that relative position to the inspection station. The government inspector passes on each individual bird and removes and destroys those showing evidence of disease. From the inspection station, viscera pass along on a rotary table where the operators remove the liver, heart and gizzard. The heart and liver are washed immediately, while the gizzard is taken to another table for emptying and removal of the lining. All giblets are carried on trays to a table and wrapped in parchment paper for return to the body cavity of the birds. For institutional and special packs, the giblets may be packaged separately.

Meanwhile, the birds are conveyed away from the eviscerating table and the body cavity cleaned over a stationary trough. An operator on a platform washes the inside of the birds with a low-pressure hose as they pass along the overhead conveyor. The outside is washed in a spray tunnel. After draining, the giblets may be stuffed into the carcasses while the birds still are suspended by their feet. Upon removal from the conveyor, the birds are placed manually on the cutting, wrapping and packing tables. From these tables the wrapped and packed birds are moved promptly to the freezer.

Better Materials Handling

A recent development is the rotary eviscerating table shown in elevation view on the flow diagram. It is driven by arms that contact the shackle chains, providing perfect synchronization with the overhead line. Great saving in critical materials is affected by this table over the straight conveyor table with individual motor drive and variable-speed control. It is attractive, compact, lower in cost than the older type of table, and it effectively fits in with the on-the-line operation. There also is an oval eviscerating table that made a popular debut in 1944.

FABLES and FACTS about FOODS and flavors

Copr. 1945 by F. B., Inc., N. Y.

TODAY'S SHORTAGES of many of the important spices from which Fritzsche Brothers' pure, concentrated essential oils are distilled, serve to recall the tremendously significant role these materials once played in world history . . . of the fact that many of the great Fifteenth Century discoveries were but a by-product of courageous exploratory effort to find new and shorter routes to the spice producing Indies. Considering our present-day dependence upon scientific refrigeration, one can readily appreciate the economic importance of these raw spices which were then indispensable in the preservation of palatable foods.

—F. B., Inc.—

RUE, at one time, was considered a powerful anti-poison. The people of Heraclea, who were fearful of the evil designs of their tyrant leader, Clearchus, never left their homes without first having eaten copiously of rue. Today, F.B. Oil of Rue serves a more practical use in the making of certain imitation flavors for the food and beverage trades.

—F. B., Inc.—

SPEAKING OF BEVERAGES, Webster's International Dictionary begins and ends its alphabetical listings of common nouns with words relating to this subject. The first word, AAM, is an old Dutch or German measure of liquids varying usually between 36 and 42 wine gallons. The last common noun, ZYTHUM, is a kind of ancient malt beverage.

—F. B., Inc.—

When man first began to use animal skins for clothes, he had to remove the adhering flesh by tearing it away with his teeth. It is believed by some authorities that the human appetite for meat was first acquired in this manner.

—F. B., Inc.—

CAKES MADE FROM THE BARK OF TREES are not as tasty as those made from Fritzsche Brothers' OIL CAKE FLAVOR FOR POUND CAKE, but Swedish peasants are known to have found them pretty tolerable fare. Birch bark was commonly used, but the most tempting cakes were those made from pine.

History records the fact that the Roman Emperor, Septimus Severus who ruled from 146 to 211 A.D., by gorging himself on one huge meal, literally and deliberately "ate himself to death".

—F. B., Inc.—

GIVING PIGEONS THE HOT FOOT isn't as silly as it sounds. Some civic minded citizen discovered that Oleoresin Capsicum, the spicy-hot ingredient widely used in the preparation of chili sauces, relishes and various highly seasoned meat products, makes an excellent pigeon-repellent when mixed with certain harmless diluents and sprayed upon window sills, cornices and public areas annoyingly frequented by these prolific birds. One or two landings upon capsicum-treated areas is usually sufficient to discourage further trespassing upon pigeon-forbidden ground!

—F. B., Inc.—

IN OFFERING F.B. OIL OF THYME merely for its flavoring and antiseptic qualities in sprays, inhalants and oral preparations, we may be overlooking another good, though limited use. Pliny advocated wild thyme as an effective antidote for the bite of serpents!

—F. B., Inc.—

CLAY charged with disintegrated organic matter is eaten regularly and in large quantities by certain African natives. The technical designation for this practice of eating earthy substances, especially clay, is geophogy. *It is fairly common among peoples of low culture throughout the world. Superstition sometimes plays a part in the practice, but it appears more frequently in connection with malnutrition. It often develops an appetite or craving, the indulgence of which favors idiocy, "green sickness", etc.*

—F. B., Inc.—

SAUSAGES AND PREPARED MEAT PRODUCTS constitute items of growing importance in the food fare of the Nation. A fact not too generally known is that the excellent flavor of many of these products is due to the manufacturer's use of spice oil compounds skillfully blended to desired specifications from pure, carefully standardized oleoresins and essential oils. The Fritzsche Flavor Catalog lists a variety of successful meat seasoning compounds along with many other interesting food and beverage flavors. Why not write us for a free copy *today?*

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Bucket brigade methods of handling are far too costly in time and manpower. Stack and pile with this new low-cost machine. Loads, unloads, handles, elevates, stacks cartons, cases, boxes, bags, other packages. Compact, lightweight, safe, easy to operate, flexible. Easily wheeled into crowded corners, around the shipping platform—fine for truck loading and unloading. Adjustable boom is clear of supporting obstructions; easily extended over piles or into car or truck. Machine held in position by floor locks on base. Reversible carrying apron. Available in four sizes, high end adjustable up to 7½, 8½, 9½ and, 10½ feet; stacks commodities as high as 14 feet. Handles individual items up to 100 lbs. Motor mechanism in base frame — plug into any convenient outlet. Write for Bulletin No. 11-FI-25.

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Portable Conveyors and Pilers

Spiral Chutes

Pneumatic Tube Systems

An improved, fully enclosed overhead conveyor line, equipped with variable-speed drive, and so constructed that it changes in level—even from one floor to another—is an important and well-received improvement in some of the later eviscerating plants. This conveyor is self-supporting and is equipped with ball-bearing rollers and automatic lubrication. It is far superior to the older "barn-door track" conveyor. Well engineered and proved under the heavy operating conditions in industrial war plants, it operates for long periods without break-down or replacement of links. The cost is but little more than that of older conveyors. Most poultry plant installations in the future quite likely will include this type of conveyor, since conveyor systems have been notoriously weak in poultry packing plants.

Satisfactory results have been obtained with the "Mechanical Plucker," manufactured under British patent, in the dry picking of "kosher killed" poultry. It will aid in the mechanization and improvement of that phase of the poultry dressing business. This machine saves the dry feathers in salable condition; feathers are in heavy demand at good prices for military use.

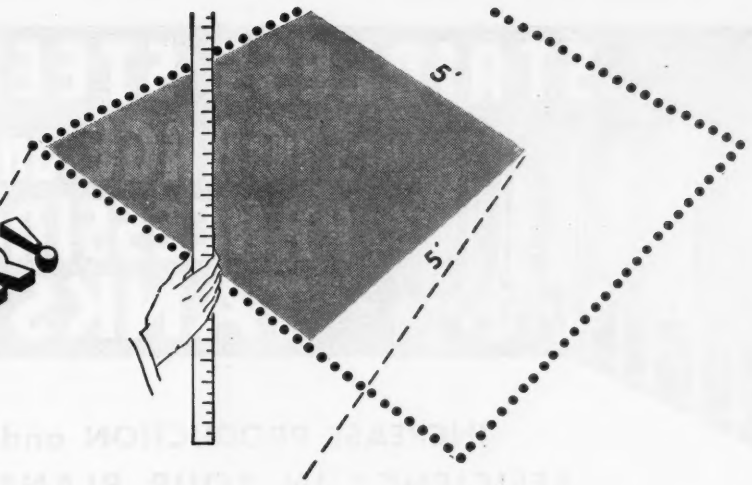
Less than 50 percent of the poultry produced by commercial packers is eviscerated, but the proportion is rising rapidly. The flow diagram shows facilities for packing "New York dressed" poultry as well as the eviscerated product. All New York dressed poultry is not frozen, as it simply may be chilled and shipped to market. The advantages of evisceration lie in providing a better bird for the consumer's table, in reducing by 25 percent the tonnage for transportation and in salvaging the byproduct value of heads, feet and viscera.

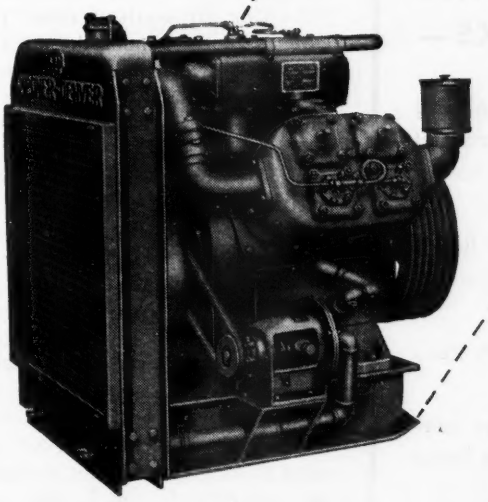
Fat Recovery

A few leading plant operators plan to install small complete rendering units to recover fat from byproducts. A yield of from 5 to 15 percent of industrial fat valuable for use in war production can be obtained, as well as poultry tankage, which is a high-protein feed supplement fully equal to meat tankage. Equipment of this type probably will be installed in all of the larger eviscerating plants when other satisfactory outlets for the viscera, heads and feet are not available through local rendering plants. Effective small rendering units are being developed.

A plant as illustrated by the flow

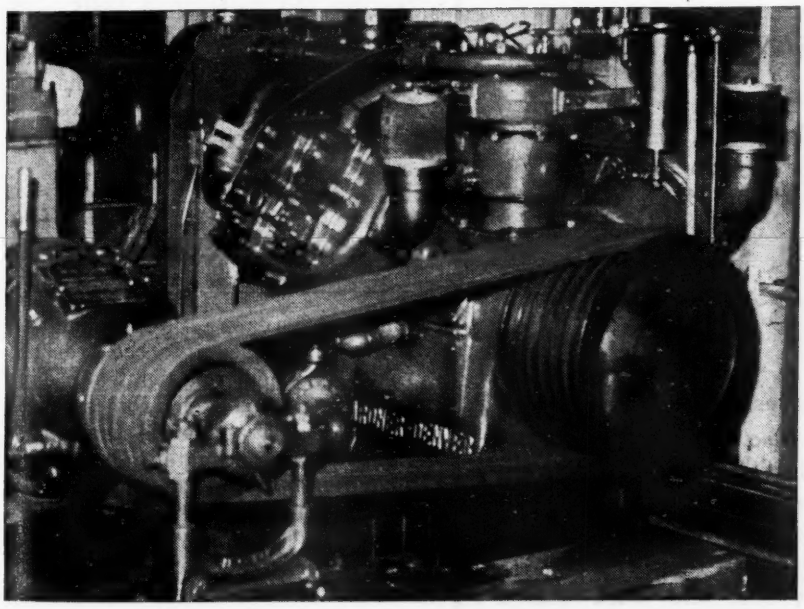
SPACE SAVER!





Five square feet! That's all the floor space needed for the Gardner-Denver "WB" Water-Cooled Vertical Compressor. Yet, despite this unusual compactness, there has been no sacrifice in efficiency. The "WB" will operate at efficiencies comparable to those of large two-stage horizontal compressors.

A distinctive design with two small- rather than one large-diameter, low-pressure cylinder, in conjunction with each high-pressure cylinder, permits the use of small, lightweight pistons in all cylinders. This construction considerably decreases the inertia load and makes possible a reduction in compressor dimensions without sacrificing capacity.



OTHER "WB" FEATURES

1. Completely water-cooled cylinders and combination radiator and air-cooled intercooler assure a cool-running compressor . . . save lubricating oil and assure lower discharge temperatures.
2. Drop forged crankshafts mounted on Timken roller main bearings for smooth operation.
3. Efficiency not affected by altitude or temperature change.
4. Available with built-in motor or can be furnished for V-belt or direct drive.
5. Efficient "clean-air" after-cooler removes moisture from air and further reduces air temperatures for longer life on hoses and tools. Available as additional equipment.

PAVING BREAKERS

Gardner-Denver Paving Breakers deliver a fast, powerful blow that helps speed industrial demolition work.

For complete information, write for descriptive bulletin on "WB"compressors. Gardner-Denver Company, Quincy, Ill.

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INCREASE PRODUCTION and EFFICIENCY IN YOUR PLANT WITH THESE SPECIALIZED TANKS—

Metal-Glass San-I-Tanks give you safe, clean and rapid handling of any chemicals or liquids. These modern tanks are constructed throughout of 18-8 Stainless Steel making them immune to all acids and exceptionally easy to keep clean.

Tanks are finished with No. 4 polish on inside and bright finish outside. All Stainless Steel welded with inside welds ground smooth and polished.

San-I-Tanks incorporate special self-draining features with specially formed bottoms sloping to the front.

Built by tank specialists, San-I-Tanks incorporate every time saving, money saving feature. For years of trouble free service insist on San-I-Tanks.

MANY SIZES IN STOCK—READY FOR IMMEDIATE SHIPMENT

We endeavor to have a supply of stock sizes in San-I-Tanks on hand at all times. We have a tank for every application and in any size you need. Write us giving complete data on the size tank you need and we will, in many cases, have the tank in stock.

LET OUR ENGINEERS SOLVE YOUR SPECIAL TANK PROBLEMS

In addition to our complete line of stock sizes in San-I-Tanks which are stocked for immediate shipment, we also manufacture special sizes built to your requirements. If you have a special tank problem get in touch with us and our engineers will be glad to give you their suggestions. No obligation of course. If it's a tank problem we can solve it for you. Over 20 years of tank building experience backs the San-I-Tank so play safe and work with a tank specialist.

Write for Complete Literature and Prices

Metal-Glass Products Co.

Dept. FI. Belding, Michigan

diagram will have a capacity of from 600 to 1,000 birds per hour in chickens and about one-half that capacity in turkeys. Single-shift operation is usual, as most plants do not have the refrigeration capacity to handle a heavier daily volume except during cold weather.

Future Bright

There is nothing in sight now that indicates any great change in the status of the poultry packing industry for the remainder of the war period. Some increase in evisceration is expected, although the amount of materials available for equipment is closely limited. Some reduction in poultry meat production is to be expected, but the importance of a high egg production is such that no sharp decrease in the industry as a whole can be foreseen.

Poultry packing likely will remain an important factor in the processed food industry. However, at least part of the future status may well depend on the progressiveness of car-lot packers. The problem is merely the development and use of methods whereby the production of good market quality meat poultry will be encouraged and the fine original flavor, tenderness and attractive appearance may be preserved until the poultry reaches the consumer's table. The function must be performed efficiently so that the spread between the producer and consumer may be low.

America's Agar Industry

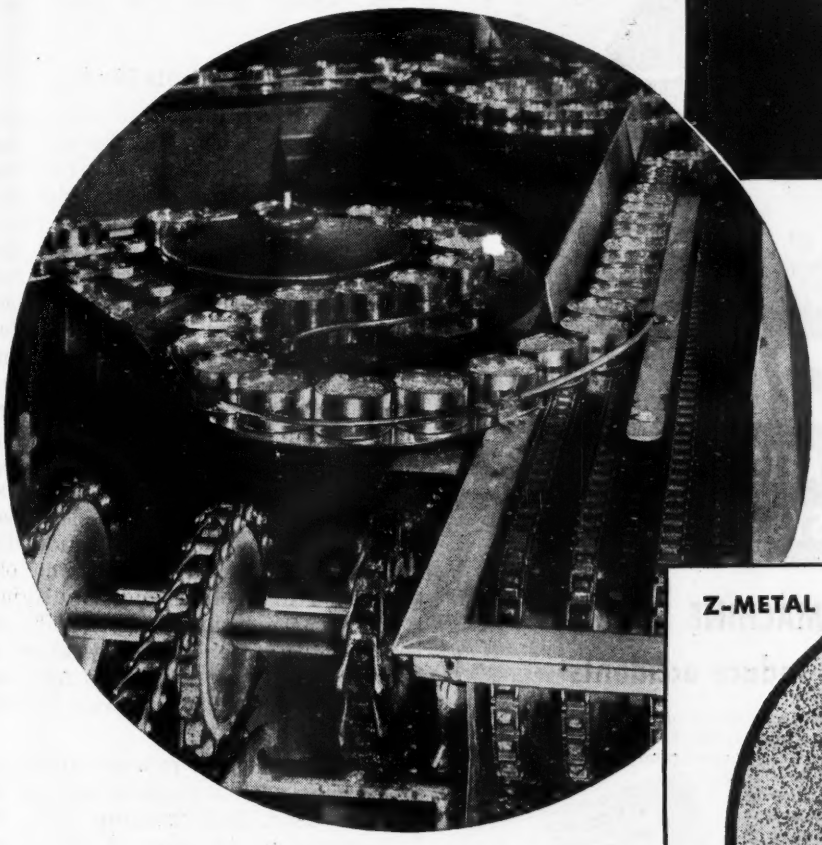
(Continued from page 85)

ping into ice cans (100-lb. capacity), which are moved into the freezing rooms and held for about two days at 14 deg. F. Taken from storage, the frozen agar gel is thawed in tanks at approximately 50 deg. F., then fed into the "dewaterer." An ordinary rotary filter, this machine retains wet agar on the screen and, by means of suction, removes the washing water containing soluble impurities.

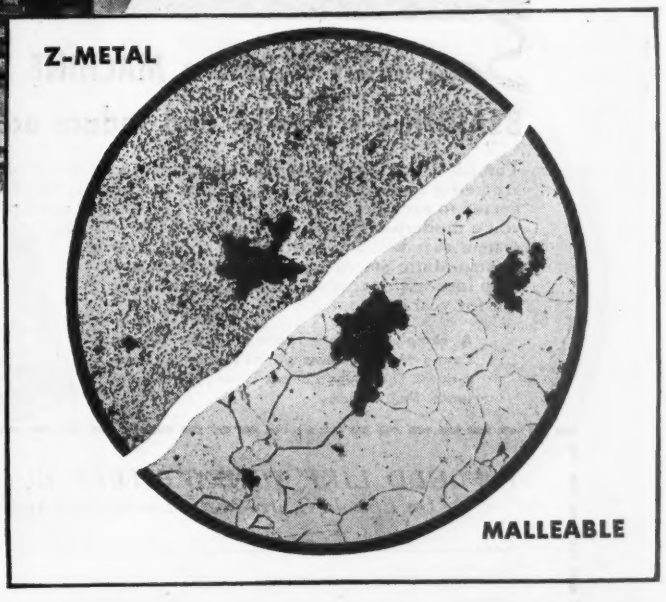
The purified agar flakes, containing about 90 percent moisture, are fed into a stack dryer where a hot air blast (215 deg. F.) holds them suspended until they dehydrate to about 35 percent moisture content. Then they are light enough to float over the top of the stack and into the down-pipe. This pipe discharges the flakes into a tank for bleaching

THESE CANS TRAVEL *via* Superhighway

1 TRAFFIC JAMS, delays, interrupted production are unknown on this canning plant conveyor. Just like a modern superhighway system, the cans keep moving smoothly along—never jamming, never hesitating. Know why?



2 THIS CONVEYOR is made of Rex Z-Metal . . . the chain belt that's built to take it . . . to operate efficiently under moist or corrosive conditions. Ordinary chain would quickly corrode and fail if exposed to the corrosive action of fish slime, live steam and the other hazards of fish cannery service. But not Rex Z-Metal. It's a natural for canneries, bottling plants, packing and food processing.



3 THE EXCEPTIONAL QUALITIES of Rex Z-Metal are clearly demonstrated by this Photomicrograph (200 times magnification). It indicates the uniformity of Rex Z-Metal's grain structure. The small spheroidal particles in the Z-Metal are iron carbide. They and their relation to each other impart the greater strength and hardness to Rex Z-Metal. When you require high strength, corrosion and abrasion resisting qualities, get Rex Z-Metal chain belts.

* * *

Rex Z-Metal chain belts are the answer to your conveyor problems involving heavy loads or corrosive conditions. The Rex Man can help you with your chain belt application problems. For complete information on Rex Z-Metal Chain Belts, write for your copy of Bulletin No. 437. Chain Belt Company, 1616 West Bruce Street, Milwaukee 4, Wisconsin.

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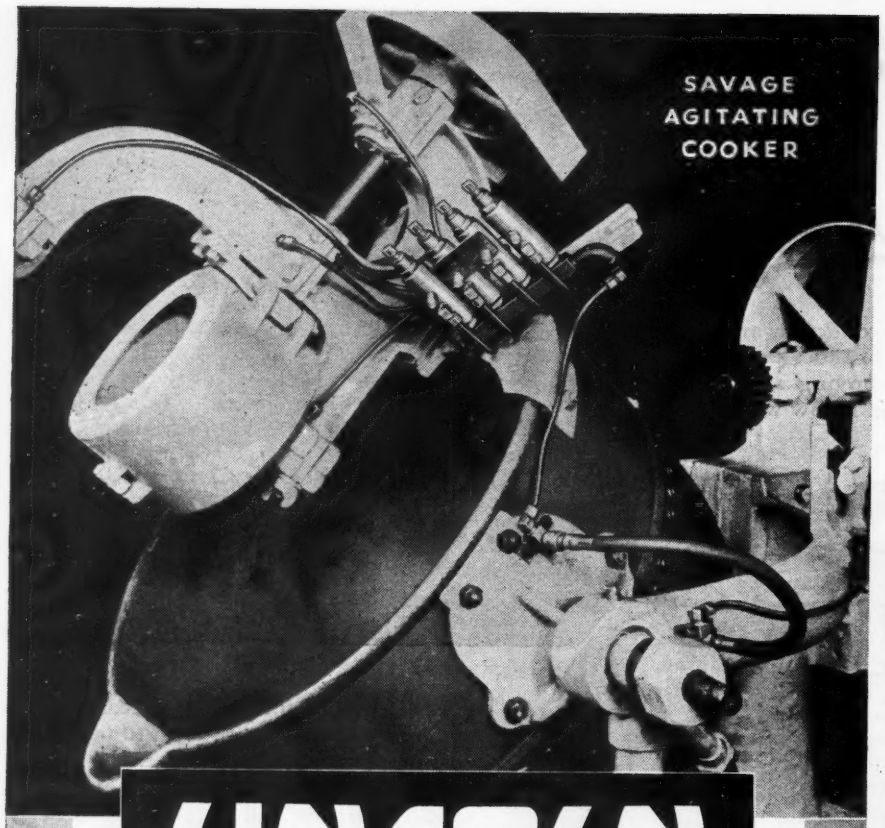

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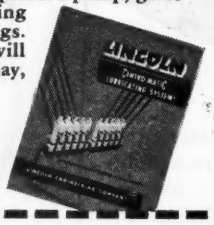

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in a 1 percent sodium hypochlorite solution at room temperature. After the excess sodium hypochlorite is reduced by a sodium sulphite solution, the bleached agar is thoroughly washed and finally dehydrated in the stack dryers to about 20 percent moisture.

Agar intended for use in some food products or in culture media is fed through a swing-hammer mill equipped with a suction fan and cyclone collector. About 35 percent of the finely ground agar will pass through a 100-mesh screen, the remainder through a 60-mesh one. Estimates indicate a loss of about 10 percent from this powdering process.

Improvements Made

The present process of agar manufacture is essentially the same as the one described and illustrated in detail by MacKinnon in FOOD INDUSTRIES (March, 1930, page 123). There are, however, certain improvements. In the original Becker process, a special combined congealer and sizer was used to automatically cool and gel the solution. Then the solidified gel was extruded in appropriate sizes. However, Corfield found that holding or aging the material 12 to 24 hours during the period of gelation produced more and better agar. The present process eliminates the automatic congealer and substitutes the old method of cooling and solidifying the agar solution in open tubs or cans at atmospheric temperature, a practice that is now being followed by all of the agar factories in California.

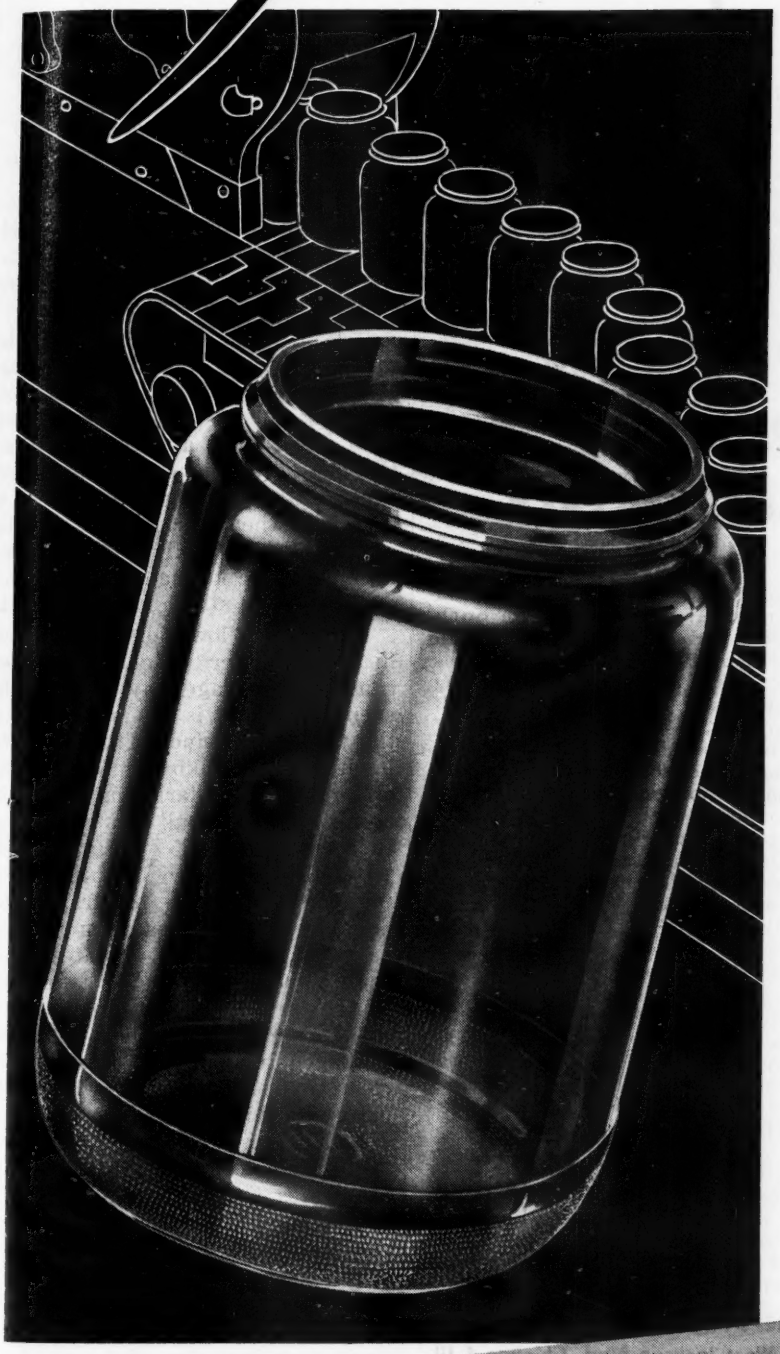
In the original process, standard ice cans with a capacity of 300 lb. were used. But freezing was not homogenous in cans of that size, and the central portion of the block was not always completely frozen within two days. Therefore, a thinner can with a capacity of only 100 lb. was adopted.

Formerly, activated carbon was used in the mixing and clarifying tank before filtration to decolorize the agar. It was found that unless especial care was taken carbon particles would pass through the filter and eventually appear in the finished agar flakes. Decolorization by carbon was therefore discontinued, and hypochlorite bleaching was introduced at a later stage in the process.

References

Anonymous, 1927. Producing Agar from California Seaweeds, Chemical and Metallurgical Engineering, vol. 34, 5, 294-296.

For HIGH SPEED *Fruit and Vegetable* PROCESSED PACKING



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- Highly resistant to thermal shock
- Surprisingly low packing line costs
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- Puts your quality where housewives see it

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Fruit and Vegetable Jars

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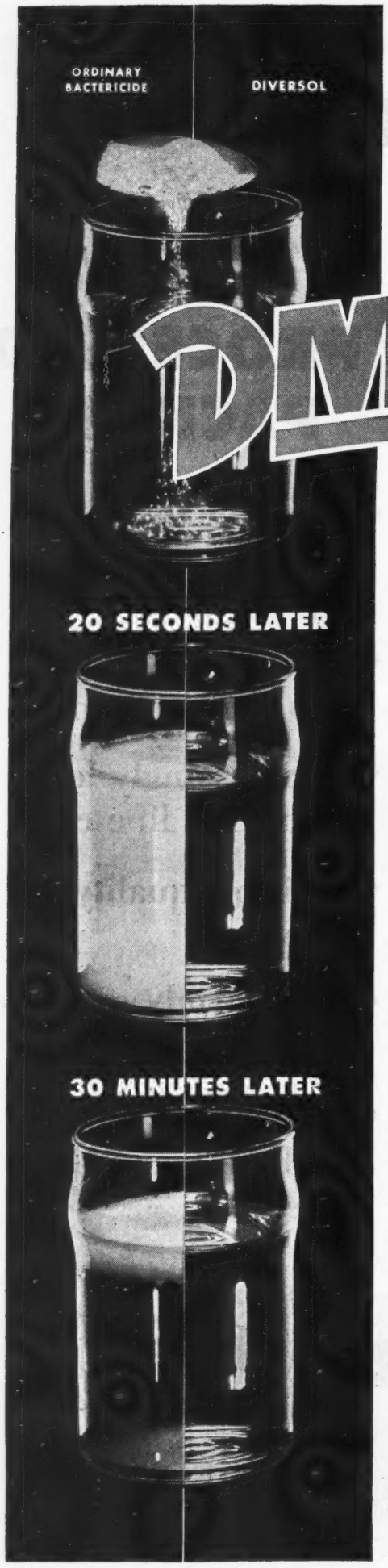

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The perfect disinfectant for food plant equipment must be both *quickly* and *completely* soluble. In less than 20 seconds DIVERSOL is 100% dissolved . . . as the adjoining pictures will testify. In a full half hour, 30% to 40% of the material of which some bactericides is composed remains undissolved. Not only is this insoluble portion unusable, it creates a condition that frequently leads to contaminating deposits.

Quick, complete solubility contributes much to DIVERSOL'S efficiency . . . even more to its proven economy. With DIVERSOL there is no sludge or waste . . . every crystal goes into immediate action . . . wastes no time . . . gives full value for money invested.

A quick-acting, non-corrosive disinfectant, DIVERSOL also has the unique ability to penetrate invisible grease films beneath which food-spoiling bacteria are likely to lurk. Comes in stable crystals that *seal-in* the available chlorine until dissolved in water. With DIVERSOL it is a simple matter to prepare solutions of a definite, germicidal strength. Just add to water . . . then use as a rinse or spray.

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U. S. Patent 1,726,942.

H. D. Mackinnon, 1930. Agar: A Colloid of Importance, Takes Its Place As a Food Adjunct, Food Industries, vol. 2, 123-127.

G. Ross Robertson. 1930. The Agar Industry in California. Industrial & Engineering Chemistry, vol. 22, 10, 1074-1077.

C. K. Tseng. 1944b. Utilization of Seaweeds. Science Monthly, vol. 59, 37-46.

United States Tariff Commission. 1940. Glues, Gelatins and Related Products, Report No. 135, second series, xiii, 151 pp.

New Methods Produce Better Dehydrated Fruit

(Continued from page 97)

yields its moisture very rapidly; consequently, there is a very rapid build-up of the humidity in a tunnel if cars are introduced too close together.

It is preferable not to use double cars and trays closed along the long side, because of the difficulty of handling such heavy cars loaded with fresh fruit and the fact that the cars dry unevenly. The latter necessitates turning the cars on a turntable when reaching the hot end of the tunnel and putting them back into the tunnel. This can be avoided when single cars are used.

Drying to a low moisture content in a dehydrater is inadvisable because heat damage may occur easily even when this is not apparent in the finished product. This exhibits itself quite strikingly by an increased rate of darkening in storage. It is best to pull cars at a moisture content of 25 to 30 percent. After the product cools while standing for some time on trays, the moisture content goes down rapidly, particularly in dry climates. The fruit should be scraped from the trays when it reaches the desired noisture content. It can then be packaged immediately or stored in clean wooden boxes in which the rate of drying is greatly reduced if the boxes are stored close together in a cool place. Sulphur dioxide losses are not great during a brief storage in boxes under these conditions.

Plant Layout

Although the plant layout is an important factor in efficiency of operation and low cost of production, it is not always possible to have an ideally designed plant. Many dehydration plants start in a very small way and with the view of dehydrating a single fruit. Most plants constructed during the past few years, however, have been built to dehydrate large tonnages of a number of products. But many of the features

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of an ideal plant layout are missing even in some of these newly constructed plants.

Location is an important factor and should be given serious consideration from the standpoint of availability of raw material, labor, transportation facilities, water, sewage-disposal facilities and fire protection. Taxes and insurance also play a role in determining plant location.

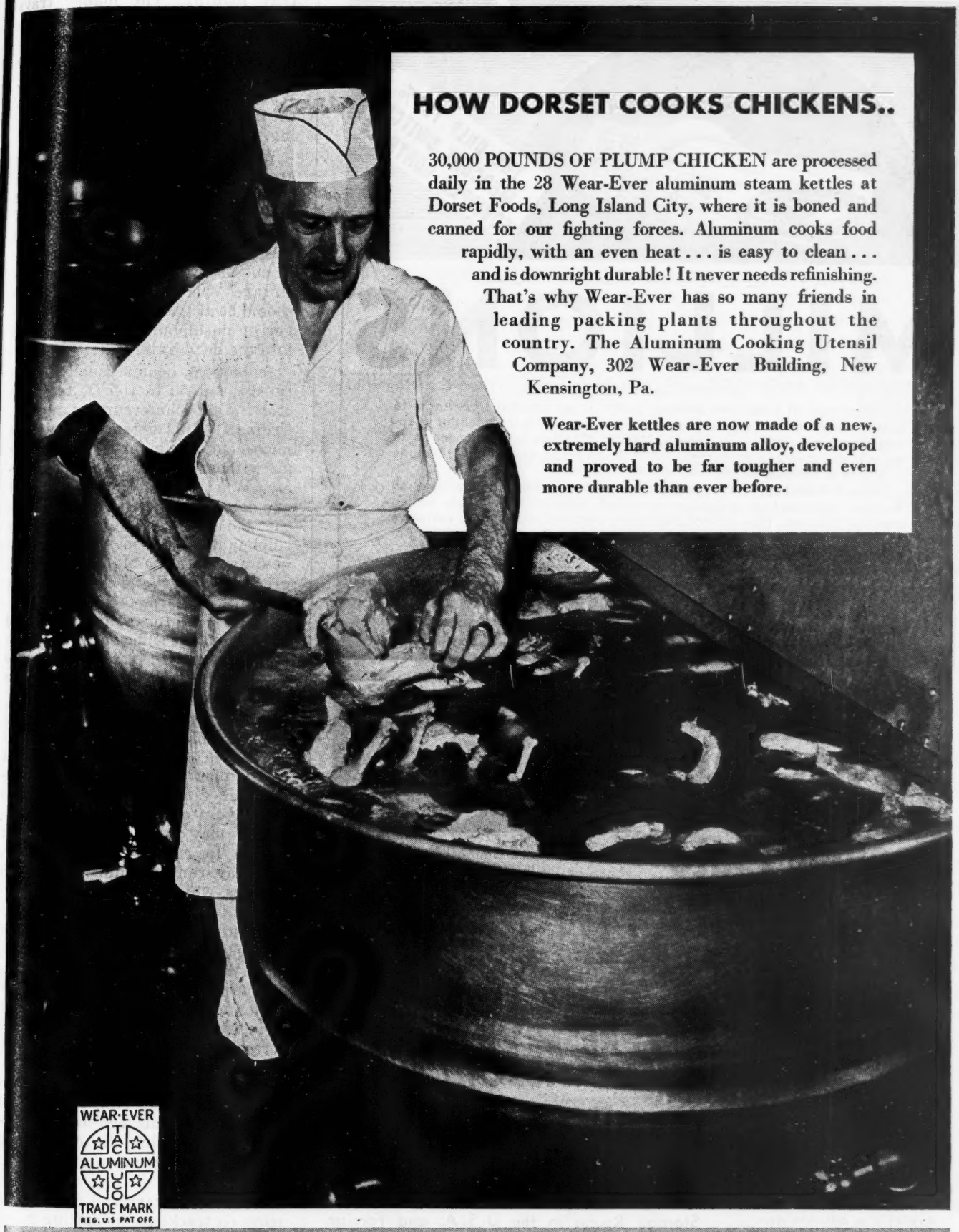
Any new dehydration plant should be built so as to allow for expansion and diversification in the types of products dehydrated. The desired arrangement permits an even flow of the product through the plant without "bottleneck" inefficiencies or excessive labor requirements. In a well-planned layout, adequate sheltered storage space will be provided for the fresh and dried products, as well as boxes, trays and other equipment.

An adequate sewage system, sloping floors, well-placed drains, oiling of dusty areas adjacent to the plant, and high-pressure water outlets are essential to maintain the cleanliness that should exist in any food plant. Since steam is available, McDaniel tees can be used to provide hot water for cleaning.

The steam plant must be of sufficient capacity to meet any demand resulting from lowered air temperature at night or an increased rate of flow of fruit through the plant.

A fresh-fruit receiving and storage room sufficiently large to permit systematic storage, green grading and easy movement of the fruit at any time saves labor and minimizes the loss of fruit resulting from storage deterioration.

The preparation room should be adjacent to the fresh-fruit storage room and sufficiently large to accommodate the different types of equipment needed for processing various kinds of fruit. Continuous cutting lines are preferable to the fixed-position types because of saving in labor. Conveyors for both full and empty boxes will avoid congestion resulting from accumulation in the cutting room. When peelers and washers are used, they should be located so as to minimize obstruction of free movement of personnel and materials through the plant. The apricot and Freestone peach line can be arranged so the loaded trays will move directly from the cutting table through the blancher. Clingstone peaches, on the other hand, are trayed after peeling and washing. The use of a shaker to even the flow of fruit onto the trays facilitates



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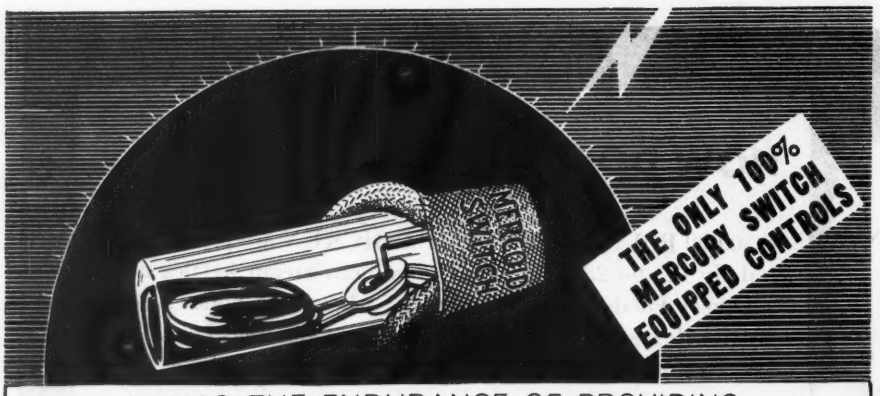

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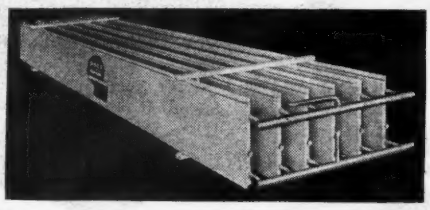

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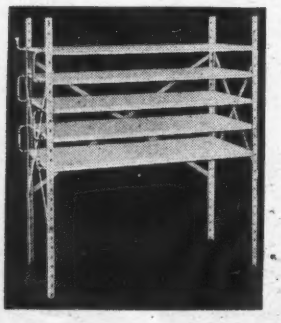

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tray loading. The loaded trays should be conveyed through the blancher without further handling and then stacked on the dehydrater car, preferably by a tray stacker. When the batch blancher is used, the trays are stacked prior to blanching.

With a good plant layout, cars are moved a short distance to the sulphuring house with minimum use of turntable and transfer cars. If the dehydraters are to be used 24 hours per day and cutting is done in one or two shifts only, sufficient storage space for blanched cars should be available, without the danger of unsulphured cars being put into the dehydrater.

Sulphuring houses usually are located about 50 to 100 ft. from the cold end of countercurrent tunnels. Ordinarily, this distance permits the movement of sulphur fumes into the air without discomfort to the workers. When the sulphuring houses and dehydraters are sheltered under the same roof, however, escaping sulphur dioxide fumes are likely to be drawn into the building, causing great discomfort and even becoming a health hazard to the workers. Storage space for cars of sulphured fruit should be sufficient to hold several cars on each track leading into a tunnel. Extra storage tracks are advisable.

So that no bottlenecks might occur, careful calculations of capacities of various pieces of equipment in the plant should be made, especially if different products are to be dehydrated. For example, an operator may have enough sulphur houses to run apricots smoothly, but may run into difficulties with peaches, which require a longer sulphuring time.

Sheltered storage space for cars of dehydrated fruit is essential, since the tray-scraping operation is frequently too slow to keep pace with the removal of cars from the tunnels. It is a common practice to scrape trays during one or two 8-hour shifts, but dehydration continues through the 24 hours. Tray splinters and adhering particles of foreign materials can best be removed by passing the dried fruit over a vibrating screen immediately after scraping.

The empty trays and cars should move on tracks to the cutting room. All trays should be washed at the end of each cycle.

The dried product should be stored in clean boxes in a clean, fumigable warehouse. It is inadvisable to use bins.

The market opened by

Vitamin D

● Last year, there were more than three million babies born in the United States. Every one of those babies needs some source of Vitamin D in order to grow up with strong bones and sound teeth.

This opens up a market that might well be investigated by anyone connected with the food industry. The development of this market by fortifying foods with Vitamin D has a number of interesting factors:

(1) Vitamin D, unlike other vitamins and minerals needed for adequate nutrition, is not found in appreciable amounts in foods listed in government food charts,

(2) food products, in general, are not as yet extensively fortified with Vitamin D;

(3) a totally new direction is opened to many for product improvement.

When you consider these facts, you can see that fortification of foods with Vitamin D has many possibilities from the standpoint of performing a distinct nutritional service in making Vitamin D universally available and from the standpoint of business expansion.

If your own plans for the future of your product have not yet taken full shape, you might consider the advantages of making use of Vitamin D. And, if you find you are interested in the situation, we invite you to write for more complete information regarding Vitamin D (A.R.P.I. Process) and its use in your own particular food product.

FACTS ABOUT VITAMIN D

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Vitamin D (A.R.P.I. Process) is produced by activation of pure crystalline ergosterol with low velocity electrons. Biologically standardized, it is available in several concentrations (U.S.P. units of Vitamin D per gram), in two types of carriers. Requires no special incorporation equipment and does not impart taste or odor to any foods fortified by it. *Not under allocation. Readily available!*

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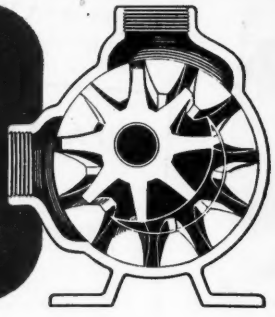
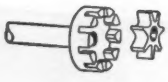


AS ILLUSTRATED above, Viking Rotary Pumps operate on the famous "gear-within-a-gear" principle, which provides a larger sealing surface that reduces slippage so prevalent in some rotary pumps after being in service for a time.



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References

1. A. S. Crafts, Some Effects of Blanching, Food Industries, vol. 16, 184-85, 1944.
2. C. D. Fisher, E. M. Mrak and J. D. Long, Effect of Time and Temperature of Sulphuring on Absorption and Retention of Sulphur Dioxide by Fruits, Fruit Products Journal, vol. 21, 175-176; 199-200; 237-238, 1942.
3. J. D. Long, E. M. Mrak and C. D. Fisher, Investigations in the Sulphuring of Fruits for Drying, University of California Agricultural Experiment Station Bulletin 636, 1-56, 1940.
4. E. M. Mrak, H. J. Phaff, C. D. Fisher and G. Mackinney, Dehydration of Fruits Offers Important War-time Advantages, Food Industries, vol. 15, 59-62, 1943.
5. H. J. Phaff, Dehydration of Apricots and Peaches, Mimeographed Proceedings of the Dehydration Conference at Modesto, Calif., Feb. 10, 1944.
6. W. B. Van Arsdel, Tunnel Dehydraters and Their Use in Vegetable Dehydration, Parts I, II and III, Food Industries, vol. 14, October, 1942, 43-46; November 1942, 47-50; December, 1942, 47-50.

Pointers on Surpluses

(Continued from page 90)

lations where the entire termination claim is less than $10,000 before disposal credits, offer buyers an immediate opportunity for lower prices. For such transactions there is no price floor. They present an excellent opportunity for small business to get leftover materials and products at lower than usual prices.

Cash or Credit?

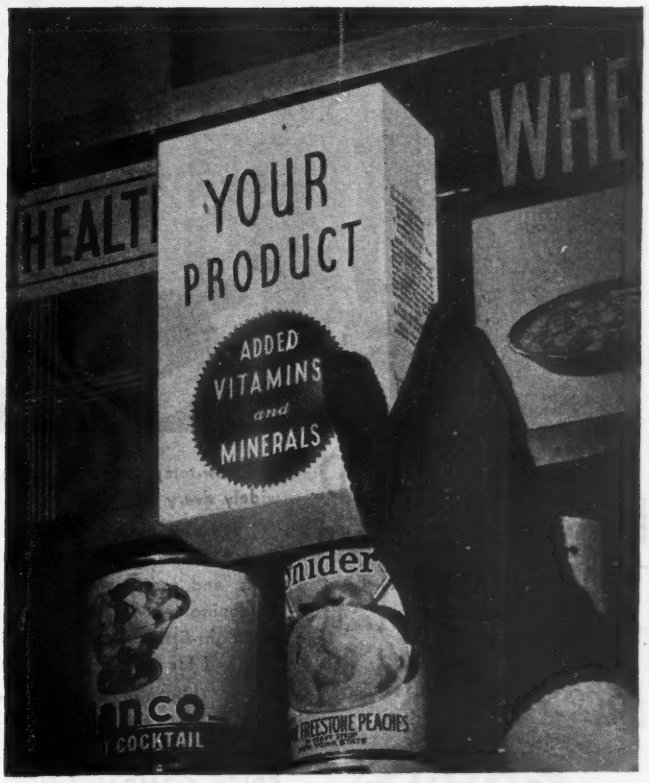
Leftover sales have undoubtedly been discouraged in many cases by the rigorous cash terms usually in effect. This deficiency has been remedied by the Surplus Property Act, which authorizes any disposal agency to make sales for cash, credit or other property. The only restriction on credit is that, in the case of (*a*) raw materials, (*b*) consumer goods, and (*c*) small tools, hardware and nonassembled articles, no extension of credit shall be for a longer period than three years.

Trademarked Goods

A ticklish question that is far from settled is the disposal of "name" or trademarked products. The crux of the problem is whether a trademarked surplus product which the Army, Navy or other government agency has been using should be sold in the open market or should first be offered to its original manufacturer in order to give him an opportunity to distribute it through his customary trade outlets.

There seems to be no general agreement within business on this issue. Many firms that plan radically different postwar models would prefer to concentrate on selling their new products and take their chances with the competition of outmoded leftovers bearing their trademarks.

Everyday in the year, millions of radio listeners are impressed by many important and convincing facts regarding the vital rôle played by vitamins in wartime nutrition . . .



As a result, label descriptions of the vitamin content of foods are receiving more attention from today's selective shopping public—a practice that will continue into peacetime.

Are You Building POSTWAR PREFERENCE For YOUR Product?

BECAUSE of wartime shortages, rationing, and the realization of the importance of proper nutrition in wartime, American housewives today are reading labels and making comparisons. They are buying the products which give them the best possible nutritional value for their money and ration points.

When the war has been won, and rationing is just a memory, the food products which achieved the wartime preference of the selective shopper, because of their nutritional advantages, will naturally continue to have postwar preference. In many instances, this decisive nutritional advantage can be obtained by the addition of vitamins and minerals.

Building "postwar preference" for your product is usually not expensive or difficult. The Merck technical staff and laboratories will be glad to help you perfect such factors as adequate distribution and retention of the vitamins, and product-control methods.

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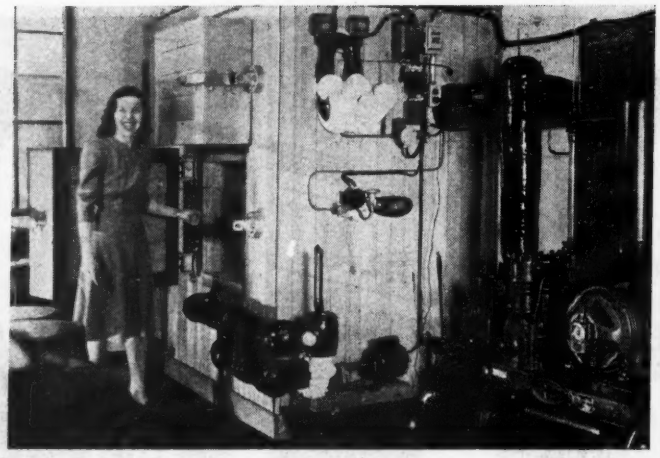

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On the other hand, firms making standardized items fear that this competition may be severe and feel they would fare better if it were placed under their own control. The chances are that manufacturers of trademarked products will be given "first refusal" on leftovers bearing their trademarks. However, their options to buy will probably be restricted by conditions that the leftovers be sold fairly promptly rather than withheld from the market or scrapped.

Egg Powder Solubility

(Continued from page 100)

45 deg. F. In powder of low sanitary quality, marked changes occurred, even at the lower temperatures, rapidly increasing in magnitude as the temperature was increased from 0 to 110 deg. F.

References

1. L. S. Stuart, Emily Grewe and Edna E. Dicks, 1942, Solubility of Spray-dried Whole Egg Powder, U. S. Egg and Poultry Magazine, vol. 48, 498-503, 524-526.
2. L. S. Stuart, H. H. Hall and Edna E. Dicks, 1942, Storage Changes in Spray-dried Whole Egg Powder, U. S. Egg and Poultry Magazine, vol. 48, 629-633, 658.
3. Standard Methods for the Examination of Dairy Products, American Public Health Association, Eighth Edition, 1941.
4. Unpublished report.

Vitamins in Candies

(Continued from page 73)

After the vitamin addition, this class of confections requires no special attention because of their presence in the batch. In large-scale production, a retention of approximately 90 percent of the added vitamin B_1 and B_2 can be anticipated when operating under careful control.

Sugar Premix

Hard candy and lozenges have been fortified experimentally on a commercial scale with good results. A powdered vitamin premix with a sugar base can be folded into the batch with the flavoring, on the cooling slab. Retention of approximately 90 percent of the added vitamins B_1 and B_2 can be counted upon.

Marshmallows present no processing difficulties. Usually, the addition of powdered premix with a sugar base is made to the liquid ingredient of the formula, the time of addition being determined by the operator's convenience.

Creams and coated fondants can be fortified by introducing the vitamin into the coating chocolate, as in the fortification of coated goods. It

...ACID·CITRIC ACID·TARTARIC ACID·CREAM OF TARTAR·C...

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Let us give you the benefit of our long experience in helping food producers increase nutrient values of their products.

Whether your problems involve *enrichment*, *restoration* or *fortification*, our Technical Sales Service is always ready to serve you.

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is also possible to introduce a powdered vitamin premix with a sugar base into the cream or fondant for the centers.

Nut and coconut candies can be fortified by mixing the vitamins with the salt or some of the sugar. Roasting of the nuts usually destroys more than 80 percent of the natural vitamin B_1 content of the raw nut, so that fortification of the nut candies is important.

Although processing temperatures for peanut candies run quite high, large-scale experiments show that vitamin loss during processing can be held within reasonable percentages. Also, the addition of small amounts of sodium bicarbonate to the peanut candies does not seem to have a marked effect on the added vitamin B_1, provided the processing is properly controlled. Here again, it is advisable to incorporate the premix into the batch as late as possible in the processing, but it must be well distributed before the mixture is cast on the cooling slab.

Other candy types not classified above have been successfully fortified.

Vitamin C

Vitamin C also can be added to hard candies.

The Quartermaster Corps tentative specifications for vitamin C fortified hard candy* state that each 0.6 oz. of the hard candy shall not contain less than 40 mg. of ascorbic acid. This candy has been produced in large quantities by a number of concerns. Under carefully controlled operation, the loss of the added vitamin usually amounts to less than 3 percent. Losses during ordinary shelf life and the customary accelerated aging tests are practically negligible.

The ascorbic acid is incorporated with the citric or tartaric acid and flavoring agents while the candy batch is folded on the cooling slab. The vitamin addition does not alter the appearance of the candy.

Incorporation of as much as 4 percent by weight of ascorbic acid into hard candy is possible.

Although it has been demonstrated that the vitamin enrichment of practically all types of candy is possible and can be accomplished without processing difficulties or appreciable loss of the vitamins, it is advisable for each candy manufacturer to investigate the vitamin losses in his particular processing before planning commercial production of fortified goods.

*C. Q. D. No. 44D, March 18, 1944, Tentative Specification, Type II, Class I.